Partnerships For Innovation: Accelerating Innovation Research

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Program Director
Industrial Innovation and Partnerships Division
National Science Foundation
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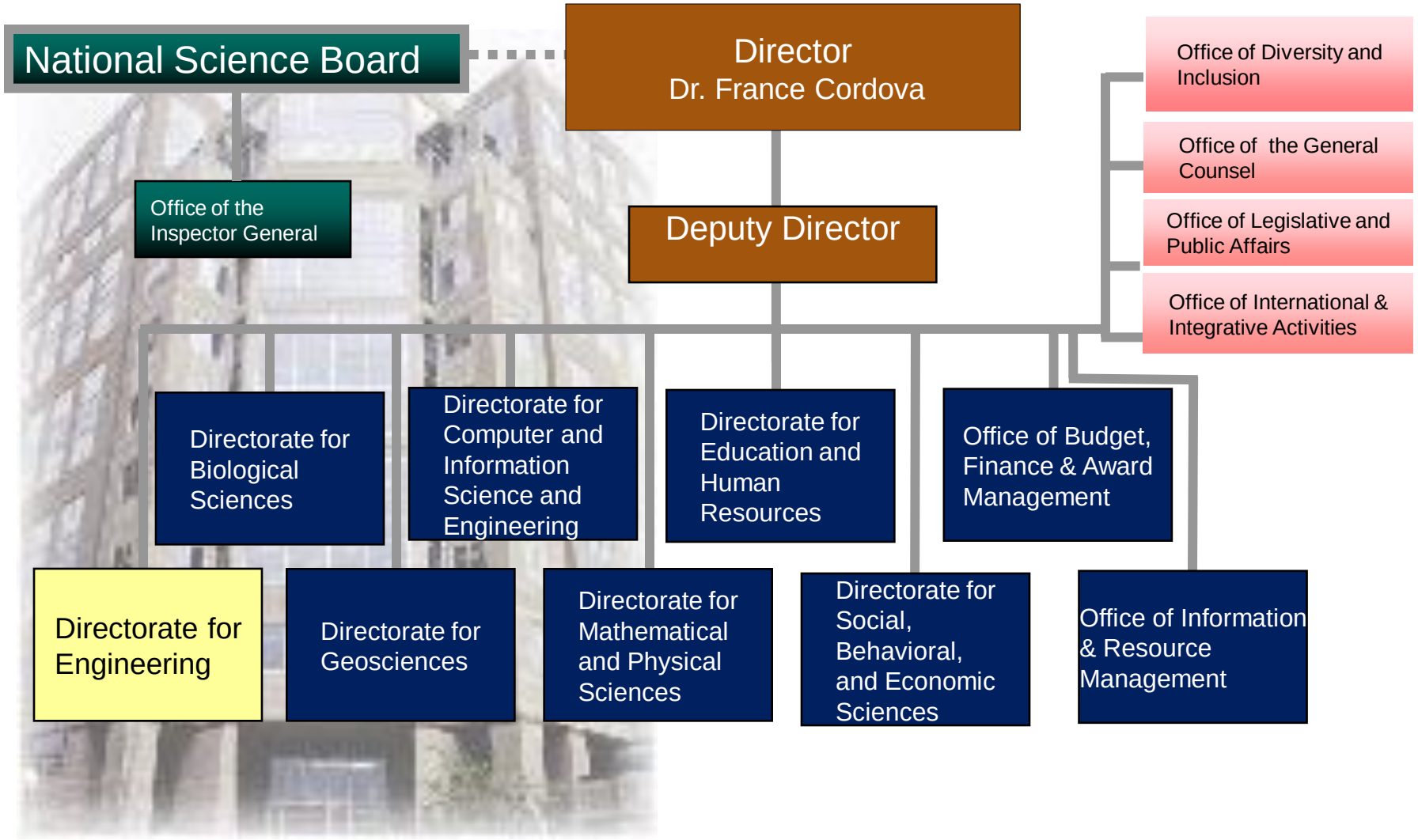
NSF Established in 1950

- Mission: From the NSF Act of 1950: "…To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…."
- Vision: "A nation that creates and exploits new concepts in science and engineering and provides global leadership in research and education."

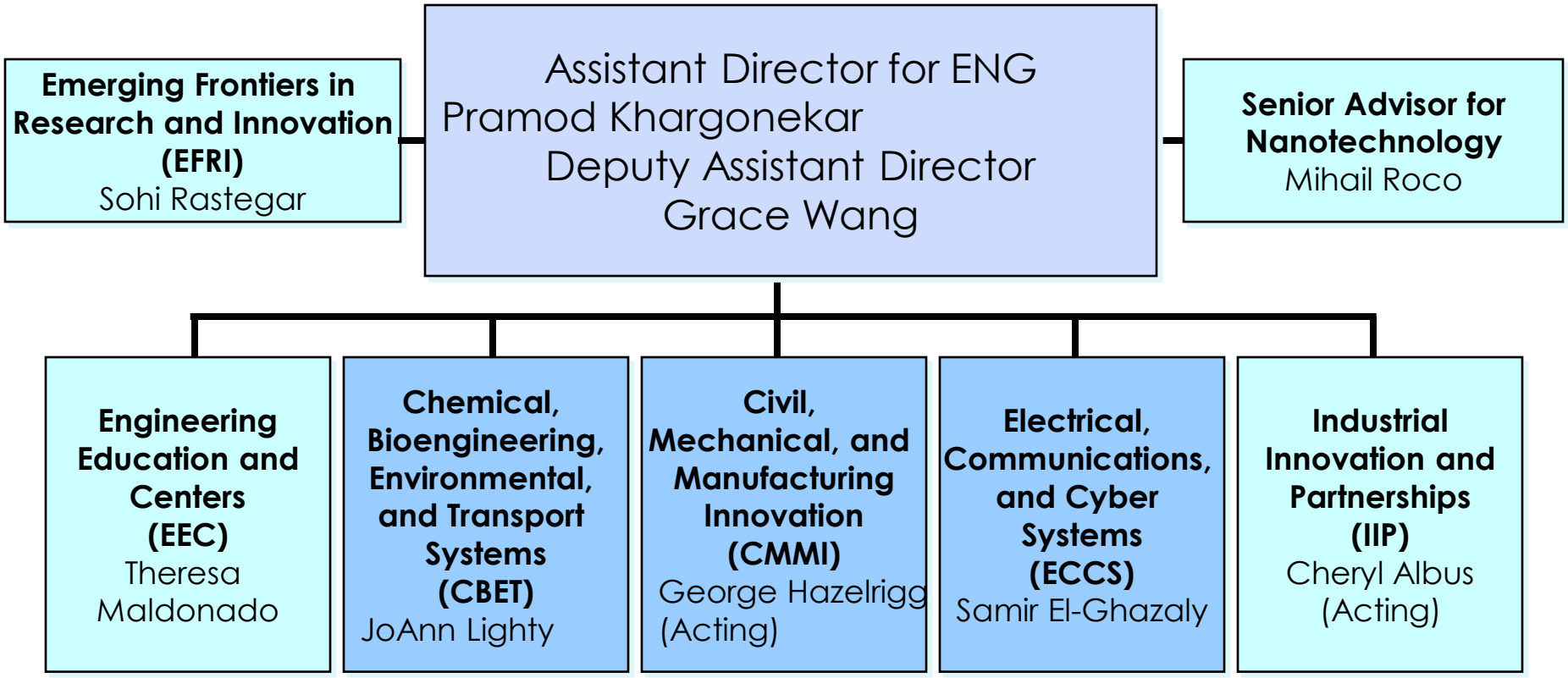
NSF Goals

Strategic Goals	Transform the Frontiers of Science and Engineering	Stimulate Innovation and Address Societal Needs	Excel as a Federal Science Agency
Objectives	• Invest in fundamental research to ensure significant continuing advances across science, engineering, and education. • Integrate education and research to support development of a diverse STEM workforce with cutting-edge capabilities. • Provide world-class research infrastructure to enable major scientific advances.	**• Strengthen the links between fundamental research and societal needs through investments and partnerships.** • Build the capacity of the Nation to address societal challenges using a suite of formal, informal, and broadly available STEM educational mechanisms.	• Build an increasingly diverse, engaged, and high-performing workforce by fostering excellence in recruitment, training, leadership, and management of human capital. • Use effective methods and innovative solutions to achieve excellence in accomplishing the agency's mission.

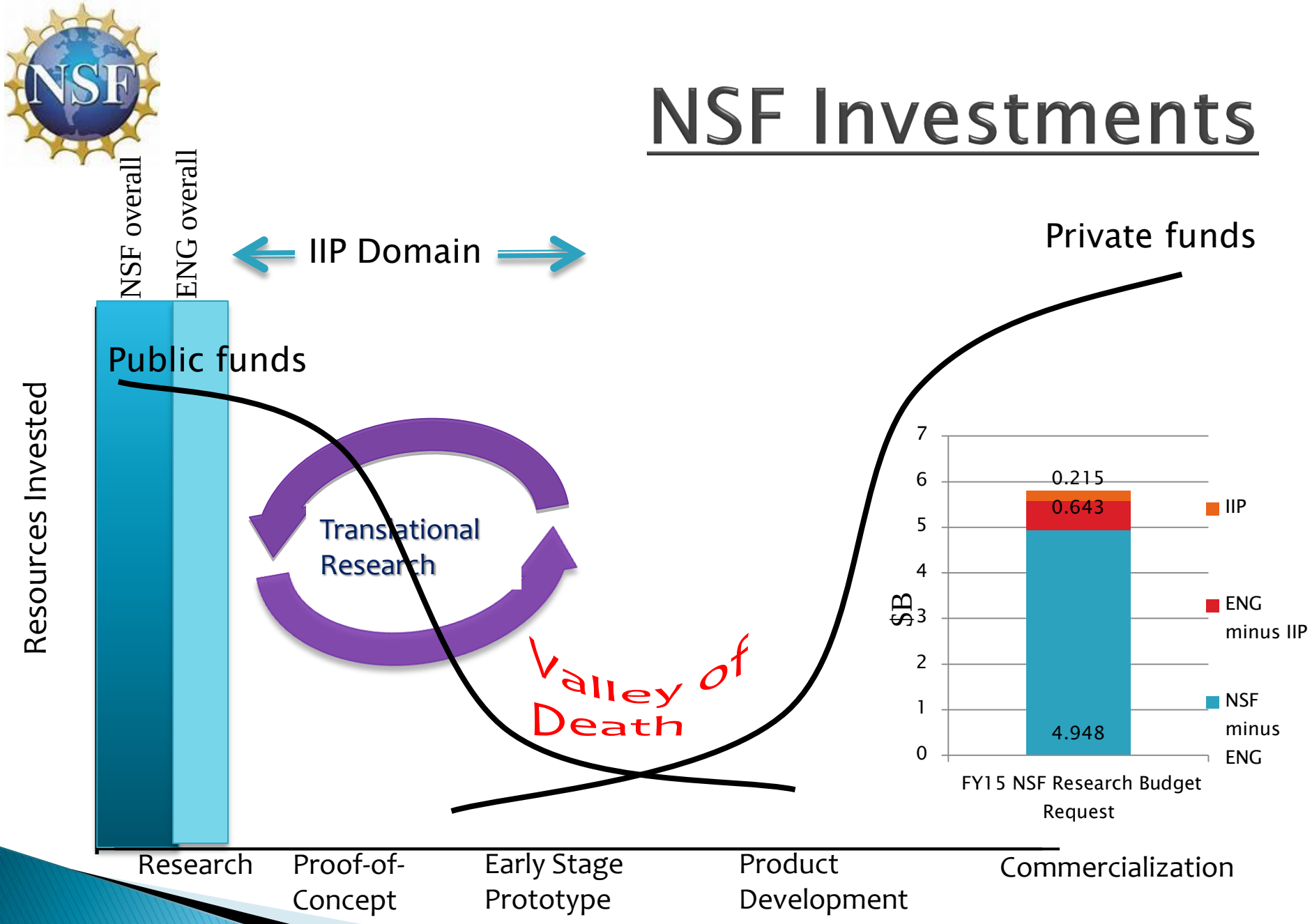
National Science Foundation



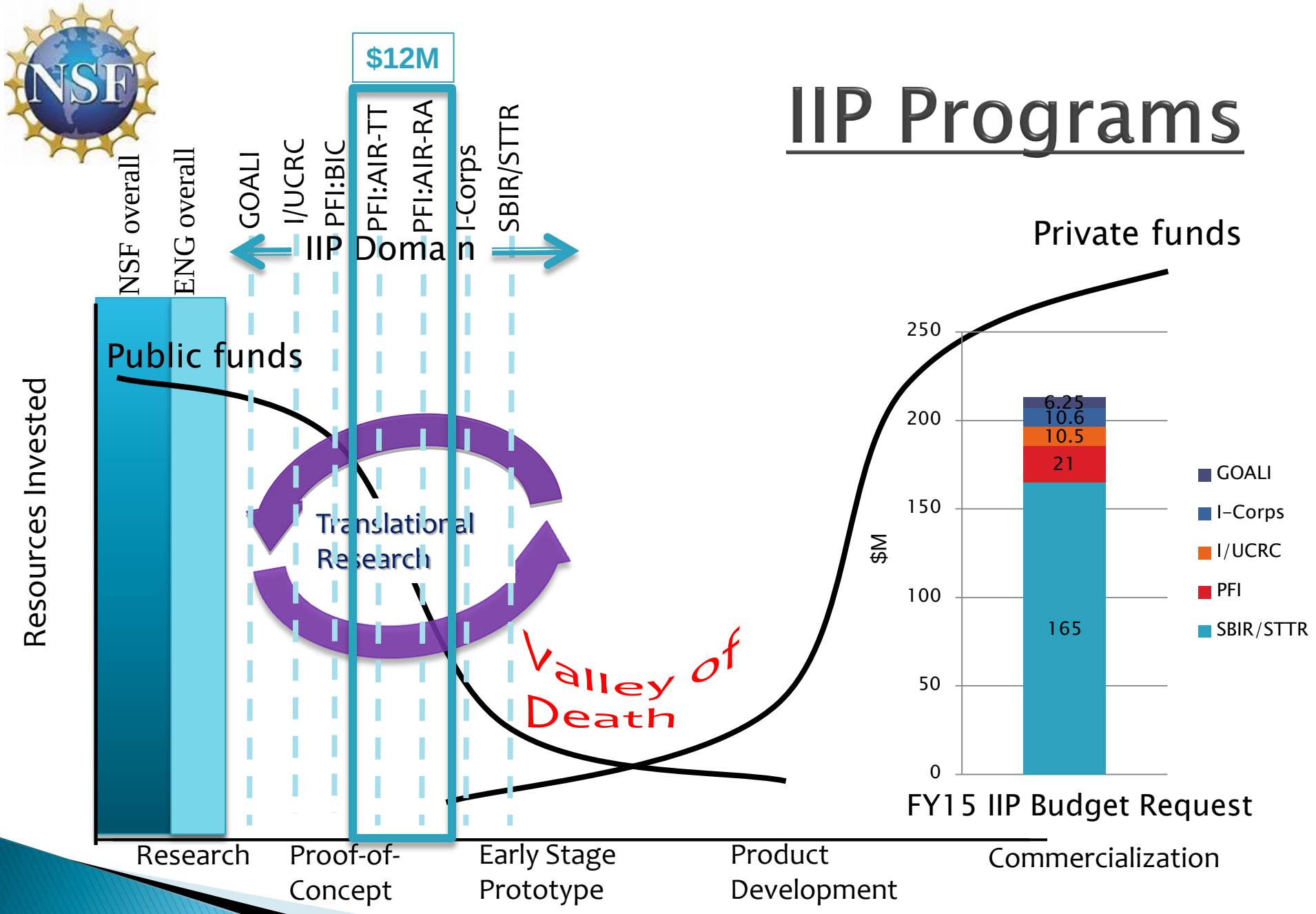
Directorate of Engineering



NSF Investments



IIP Programs



Industrial Innovation and Partnerships

Note: I-Corps FY15 funding request = $25M across the NSF

PFI: Accelerating Innovation Research (AIR)

Strategic Goal	**Accelerate the derivation of societal and economic benefit from new knowledge created in the discovery process**		
Objectives	•Leverage NSF research award investments to accelerate the translation and transfer of research discoveries into commercial realities.	• Catalyze the development or enhancement of a network of connections between researchers and persons with a use-oriented perspective.	•Engage students and faculty in entrepreneurial/innovative/market-oriented thinking.

- Two types of awards for academic researchers
  - Technology Translation (14-569): Designed for single investigators
  - Research Alliance (14-612): Designed for research consortia (e.g. centers)

AIR- Technology Translation: Leveraging NSF Investments

1. Technical

AIR domain

Basic Research

Proof-of-Concept

Early Stage Prototype

Technology/knowledge gaps

NSF-Funded Research Result

Successful Commercialization

2. Commercial

Preliminary understanding of market need, potential competitive advantage, IP landscape, regulatory hurdles. Strategy toward commercialization.

Enhanced commercial understanding, refined strategy toward commercialization

3. Educational

Student innovation/entrepreneurial experiences

Key Facts 14-569

- Two windows

LOI required	Full Proposal
Sept. 2, 2014	October 2, 2104
March 13, 2015	April 14, 2015

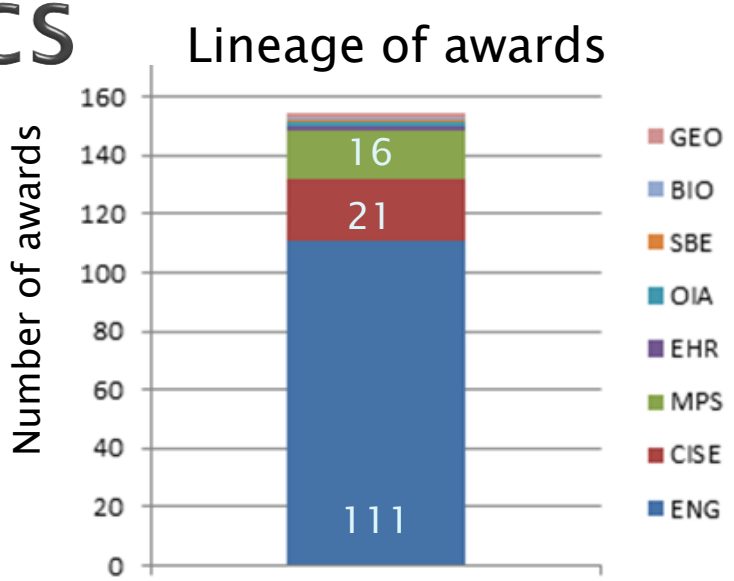
- PI/co-PI requirements:
  - PI must be faculty member at U.S. academic institution
  - Lineage: PI or co-PI must have had an NSF research award that ended no more than 6-years prior *that is the basis* for the proposed translational research work.
  - There must be at least one other individual involved in the work (co-PI, Senior Personnel, or Other Personnel) with explicit business experience.
  - PI/co-PI may submit only one proposal *per year*
- Up to $200K for 18 months

Difference from SBIR/STTR

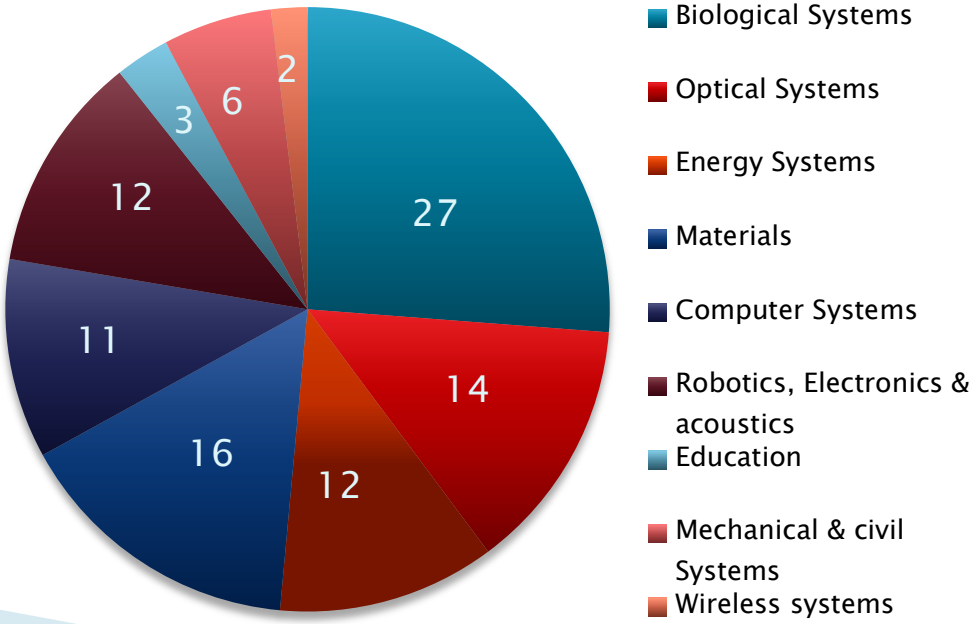
- PI must be faculty member at U.S. academic institution
  - Flexibility in funding partnerships
  - Flexibility in mode of commercialization
- Based on results from prior NSF merit-reviewed research awards
  - Focused on research necessary to move to the next step on the path toward commercialization
- Up to $200K & 18 months
  - (SBIR up to $150K & 6 months, STTR up to $225K & 12 months)
  - No Phase-II equivalent
- Entrepreneurial / Innovation experience/knowledge for students

Program Statistics

- AIR-TT: Technology Translation
  - 103 awards made to date
  - Lineage to 154 research awards
    - 25 with lineage to I-Corps
  - $18.9M funding to date
  - 7 Final Reports



Technology Areas

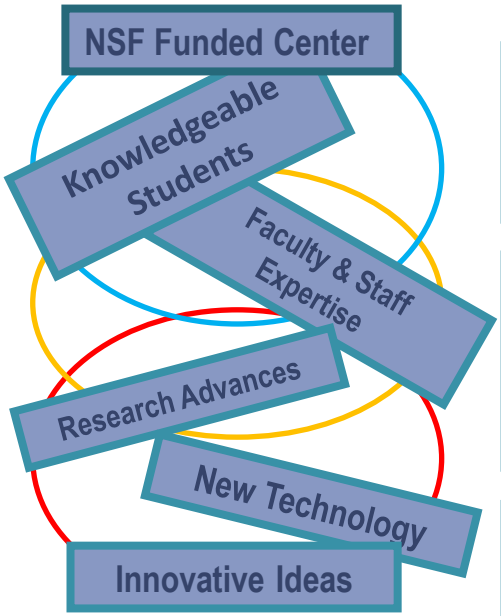


AIR- Research Alliance: Leveraging Center-level NSF Investments

Develop/enhance an academic-based innovation ecosystem to accelerate technology transfer

Research Consortium + Partner/Collaboration Entities = Expected Accomplishments

Partnership



- Does the partnership enable innovation that neither party could do as well or rapidly alone?
- Does the partnership leverage research and technology of the research consortium to accelerate innovation?
- Does the partnership impact the development of an innovation ecosystem?

Research partner(s): e.g. University, Small Businesses, Others

+

Third Party Investor(s): Up to $800K from NSF, contingent on 1:1 match

- Accelerates transfer of research results into existing businesses or start-ups
- Develops network of connections
- Develops/enhances an academic-based innovation ecosystem
- Students prepared to be entrepreneurially competitive
- Measures success

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504973

Key Facts 14-612

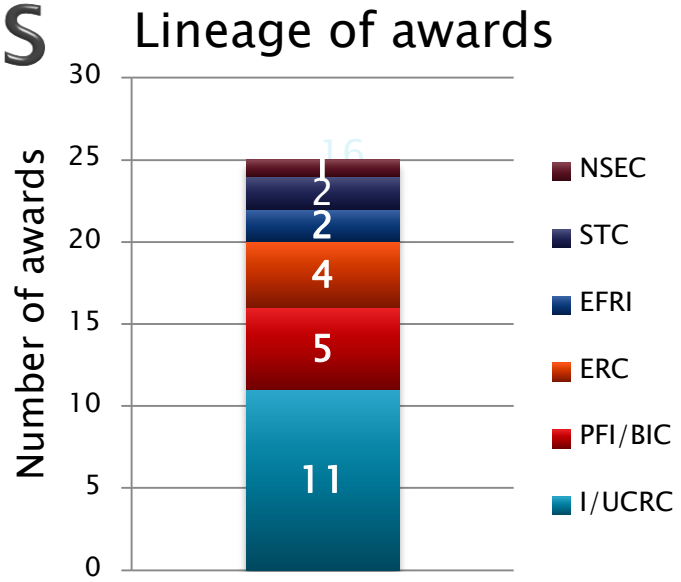
- One window

LOI required	Full Proposal
January 12, 2015	February 18, 2015

- PI must be faculty member active within an NSF-funded Research Consortium
- Technology to be translated must leverage the research of the underlying consortium
- At least one third party investor is required
  - 1:1 match, up to 25% can be in-kind
- At least one research partner is required
- Maximum award is up to $800K, 3 years

Program Statistics

- AIR-RA: Research Alliance
  - 25 awards made to date
  - Lineage to 6 consortium types
  - $20.7M NSF funding
  - $19.9M 3rd party match
  - $3.7M in-kind match
  - 3 Final Reports



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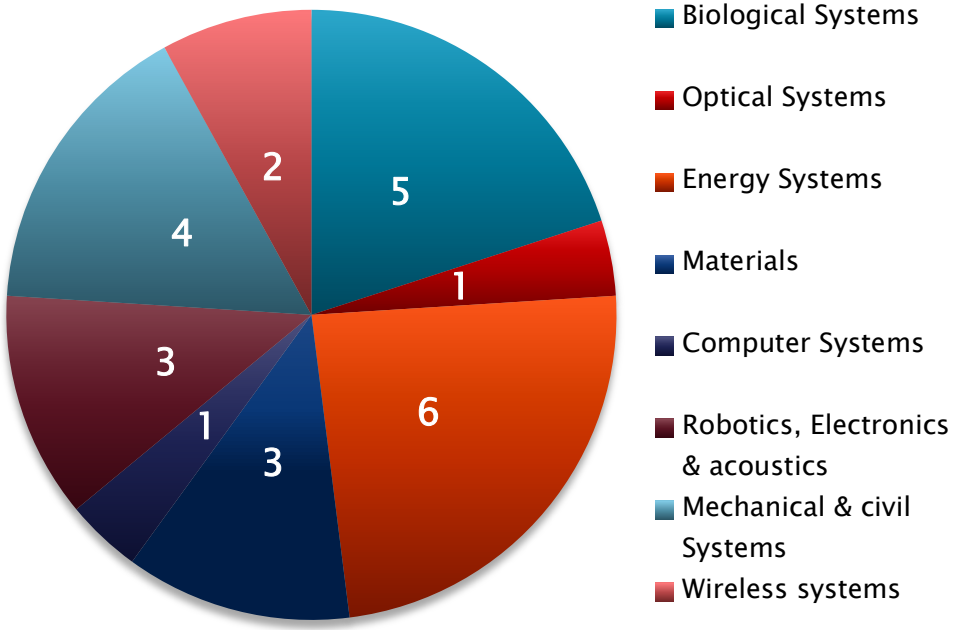

PFI: Accelerating Innovation Research (AIR)

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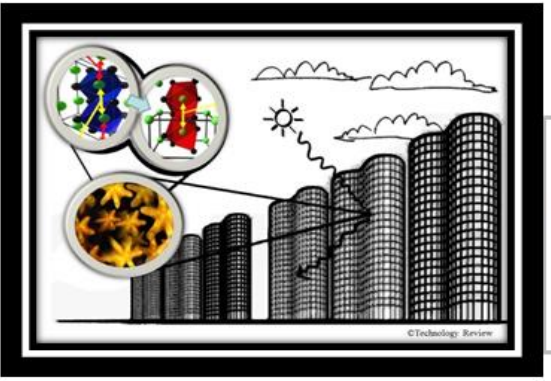
Examples…

Smart Window Technologies: PI: Sarbajit Banerjee

2009 | 2010 | 2011 | 2012 | 2013 | 2014

DMR 087169: CAREER: Synthesis, Phase Transitions, and Device Integration of Nanoscale Vanadium Oxides (2009-2014)



MIT Technology Review Selects PI as Top 35 Innovator Under 35

Jesus Velazquez
Ph.D. '12
National Academies
Ford Foundation
Fellow

Luisa Whittaker-Brooks,
Ph.D. '11
L'oreal Fellow
Assistant Professor,
University of Utah

IIP: 1311837 AIR Option 1: Technology Translation: Smart Windows for the Improved Energy Efficiency of Buildings

Kate E. Pelcher
First prize at IIP Pitch Competition

IIP: 1333405: I-Corps: Dynamic Glazing Technology Based on Nanostructured Vanadium Oxides

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Business

Panasci winners capitalize on high-tech coating

Entrepreneurs take top prize in UB's Panasci competition

Peter Marley, Ph.D. '15
Sean W. Depner, Ph.D. '14
Brian J. Schultz, Ph.D. '13

Launch of diMien LLC.

DIMIEN
DIRECTED MATERIALS IN ENERGY

diMien secures SBIR Phase I Funding to develop window films

New York State TAF invests $50,000 to de-risk technology

Quanex invests $77,500 for scale-up + first royalty payments

2009 | 2010 | 2011 | 2012 | 2013 | 2014

Quanex
building products

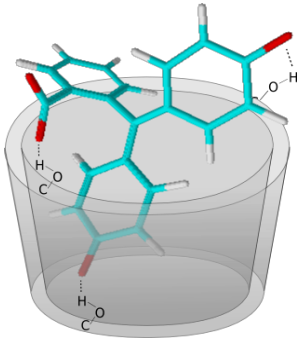
IIP: AIR 1127786, 2011 – **Water Technology Innovation Ecosystem (WaterTIE)**
Third party Investor: PA Dept. of Community and Economic Development
Technology Commercialization Partner: BenFranklin Technology Partners, PA

WATER AND ENVIRONMENTAL TECHNOLOGY CENTER

IIP IUCRC: Water and Environmental Technology (WET) Center
Industry/University Cooperative Research Center
IIP: 0855881 Phase I, 2009; IIP: 1361498 Phase II, 2014
Temple Univ. (lead), Univ. of Arizona, Arizona State Univ.
Director: Rominder Suri, PhD, Temple Univ.

AIR Technologies for Water Treatment:

1. Novel Adsorbent Filter
2. Novel Ion Exchange Resin
3. Ultrasound for pollutant destruction
4. Advanced Oxidation Processes



IIP: ICORPs 1439640, 2014; **Novel adsorbents for water treatment**

Research training to 40 graduate + 30 undergraduate students

$40 Million revenue in 5 yrs estimated by Industry partners

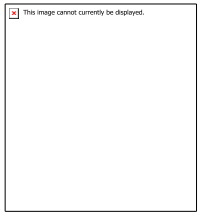
35+ Industry Members, including DoD

Student Awards:
Candice Johnson, PhD by SETAC-HDC
Gangadhar Andaluri , PhD by PA WEA

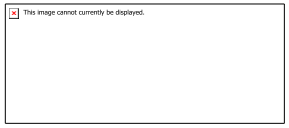
4 patents Filed
40+ Publications
120+ Presentations

Connect with PFI:AIR

Funding and webinar announcements, news, and success stories



Online:
nsf.gov/eng/iip/pfi/air-ra.jsp
nsf.gov/eng/iip/pfi/air-tt.jsp



Academe and Industry @ NSF Listserv:
Visit the PFI:AIR website to sign up

Twitter: @NSFInnovateSBIR

Channel: NSFInnovationIIP

Thank you!
Questions?

Additional questions, please contact Barbara Kenny at bkenny@nsf.gov

Thank you for your interest!