What We've Accomplished and What's Next

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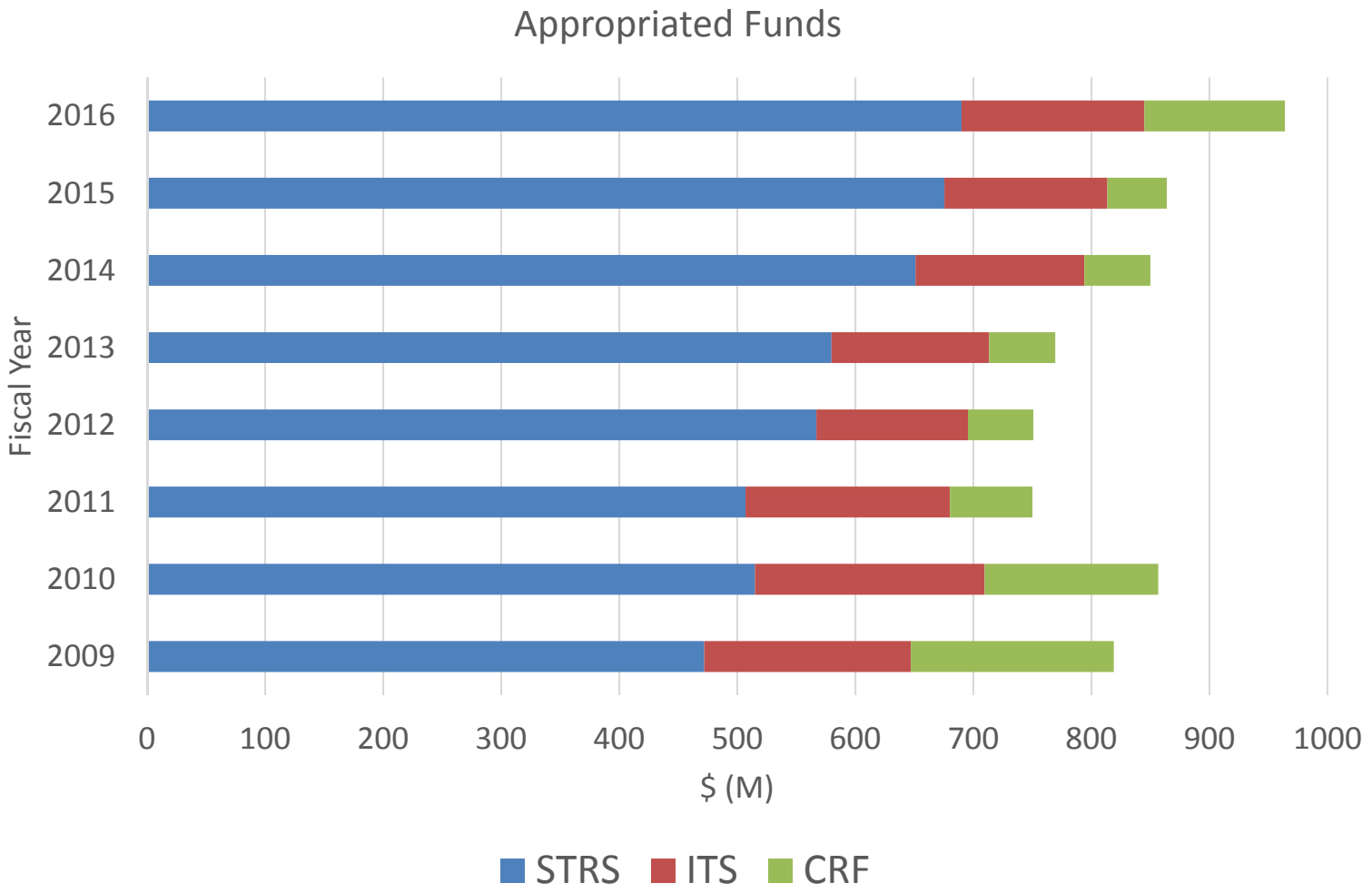
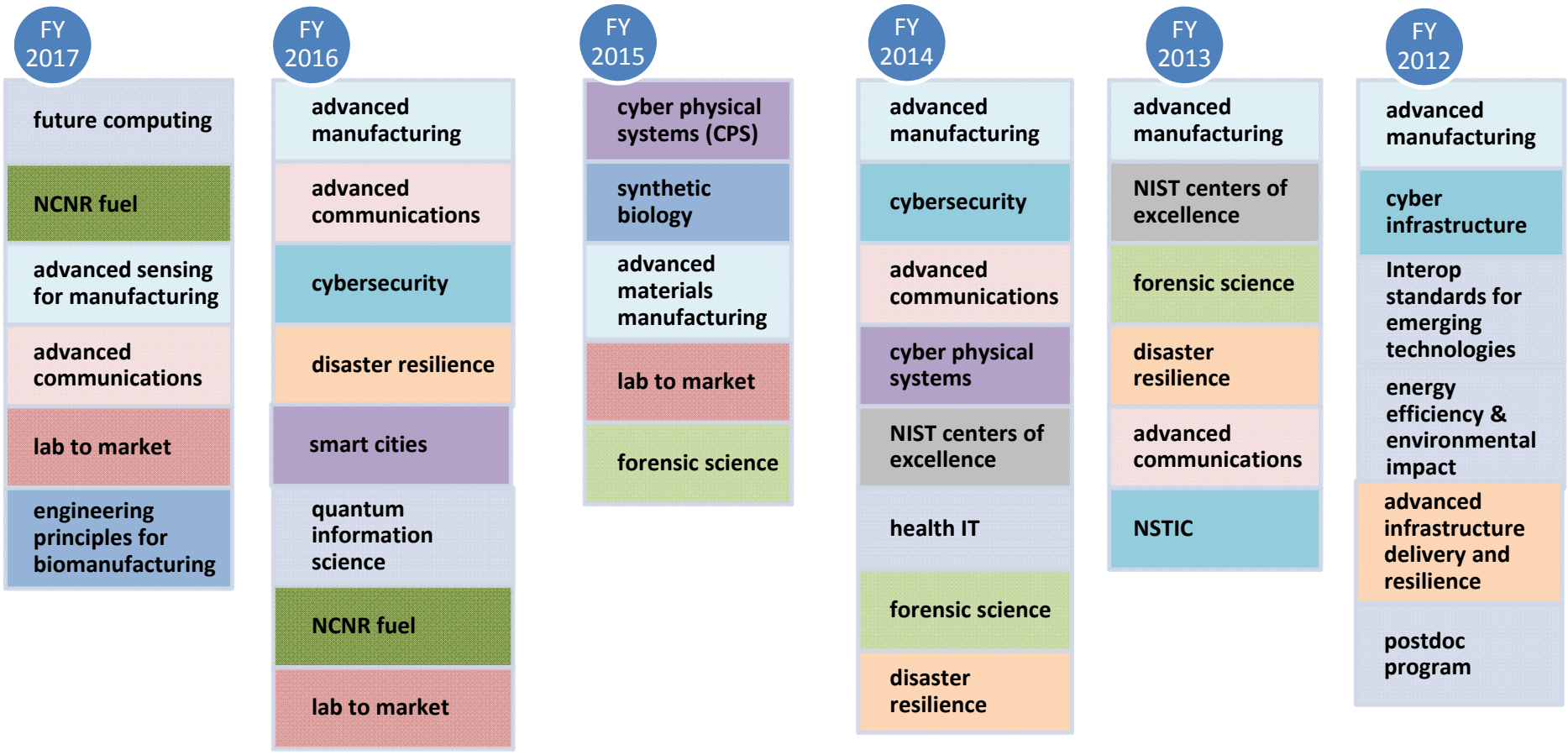
Where we've been…

- Over the past 8 years NIST has made major investments in several national priorities
- NIST has become central to the conversation in several of those areas– we're the "go-to" agency for many of them.
- NIST has proven flexible and agile in meeting national needs

Looking at the past eight years

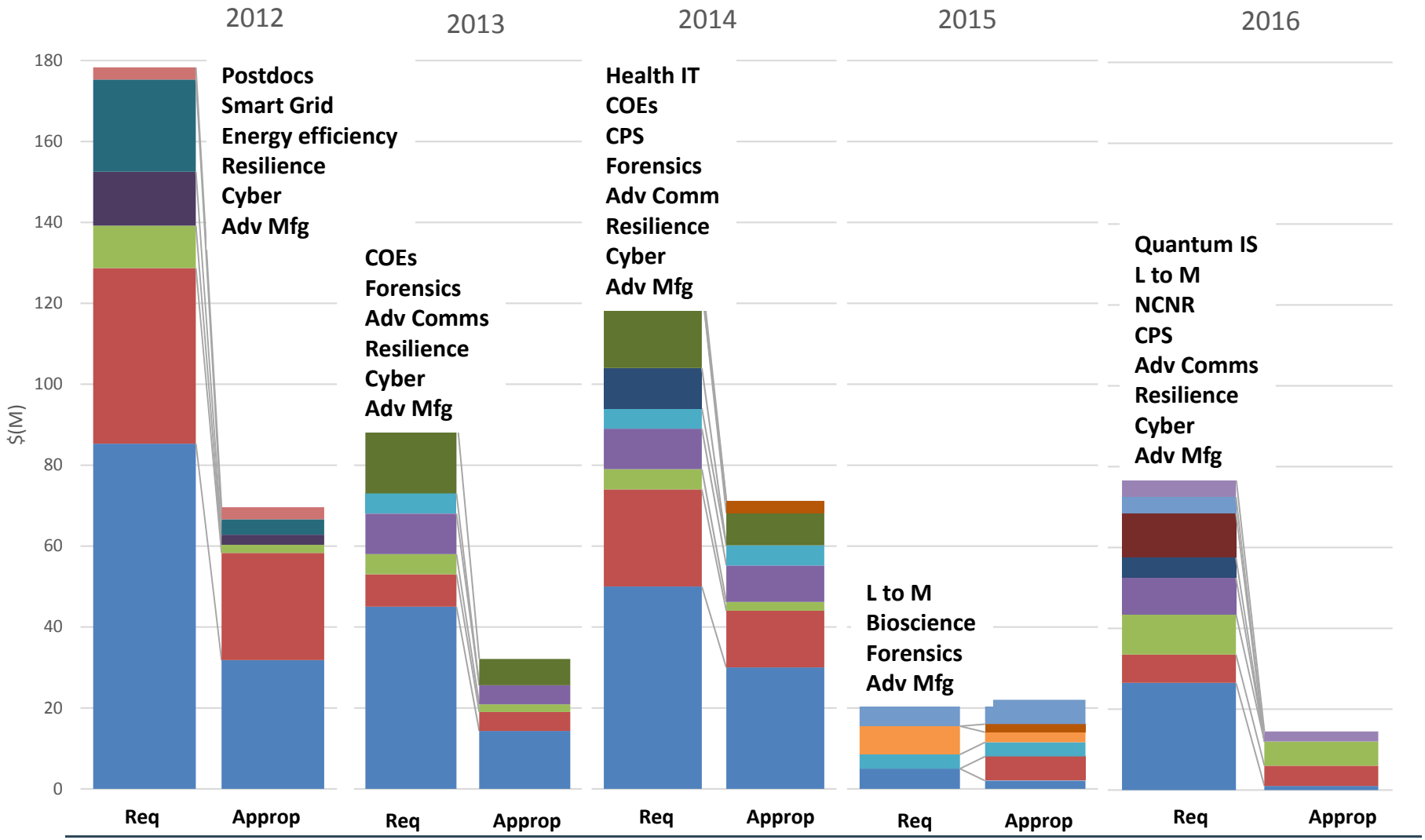


Over this time, many priorities….



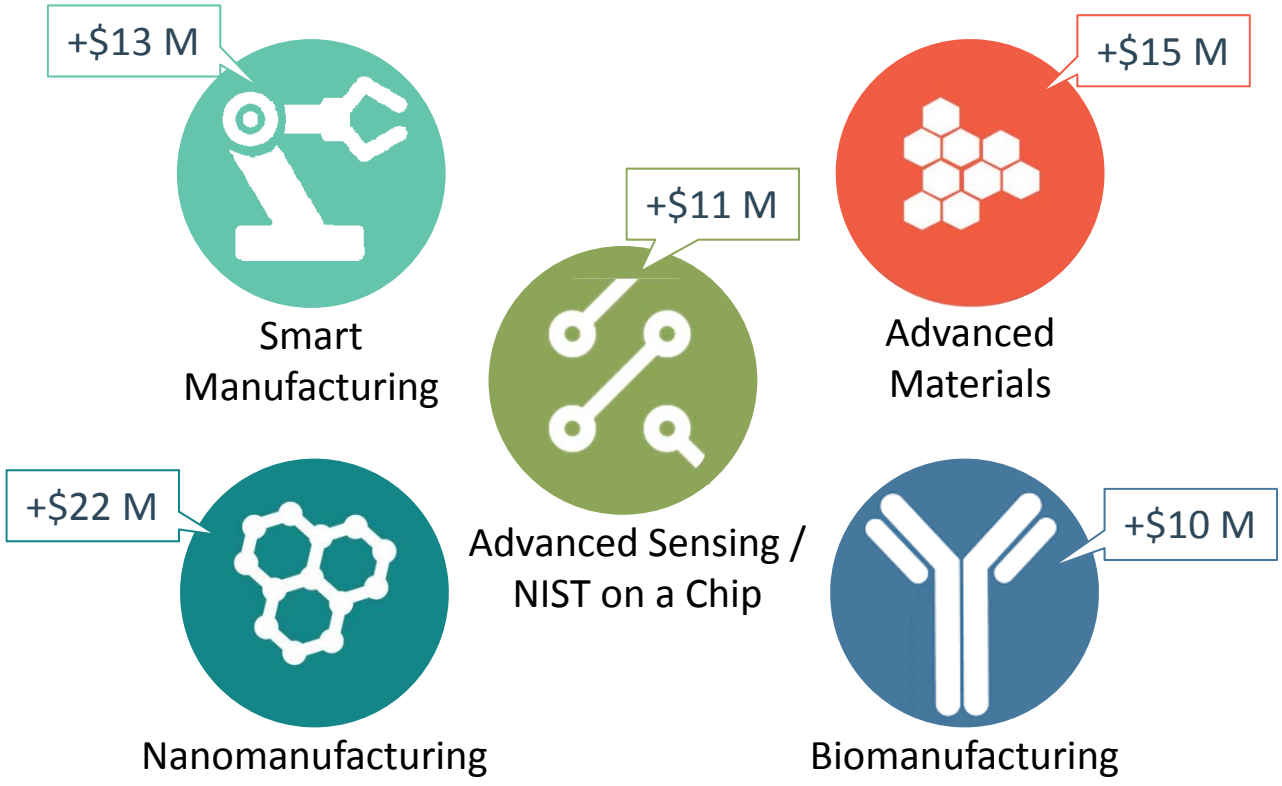
NIST Laboratory Budget Initiatives (Requests) by Fiscal Year

STRS: Requests and resulting appropriations



Programmatic growth in manufacturing

NIST lab programs gained in many advanced manufacturing technology areas



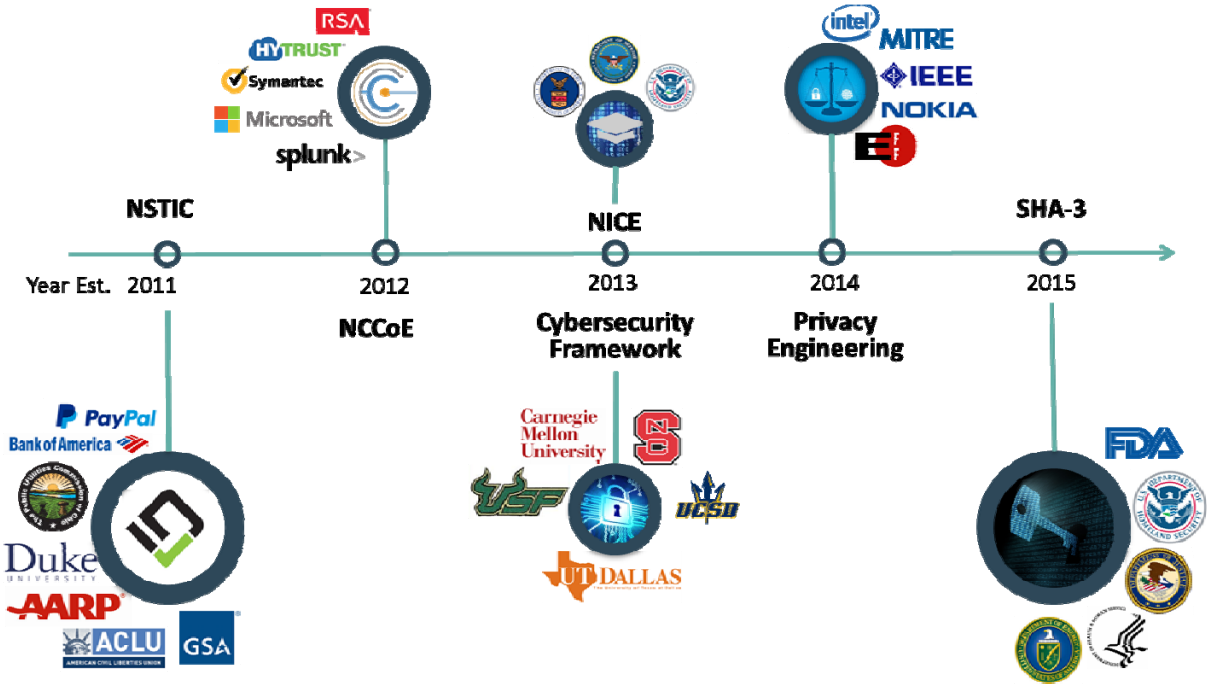
Primary focus areas represented.

$75 M increase since 2011 – to $149.5 M in 2016

External programs & administration priorities:

- Partnering with Advanced Materials Center of Excellence
- Leveraging & supporting Manufacturing USA (NNMI)
- Leading activities for interagency Materials Genome Initiative

Programmatic growth in cybersecurity



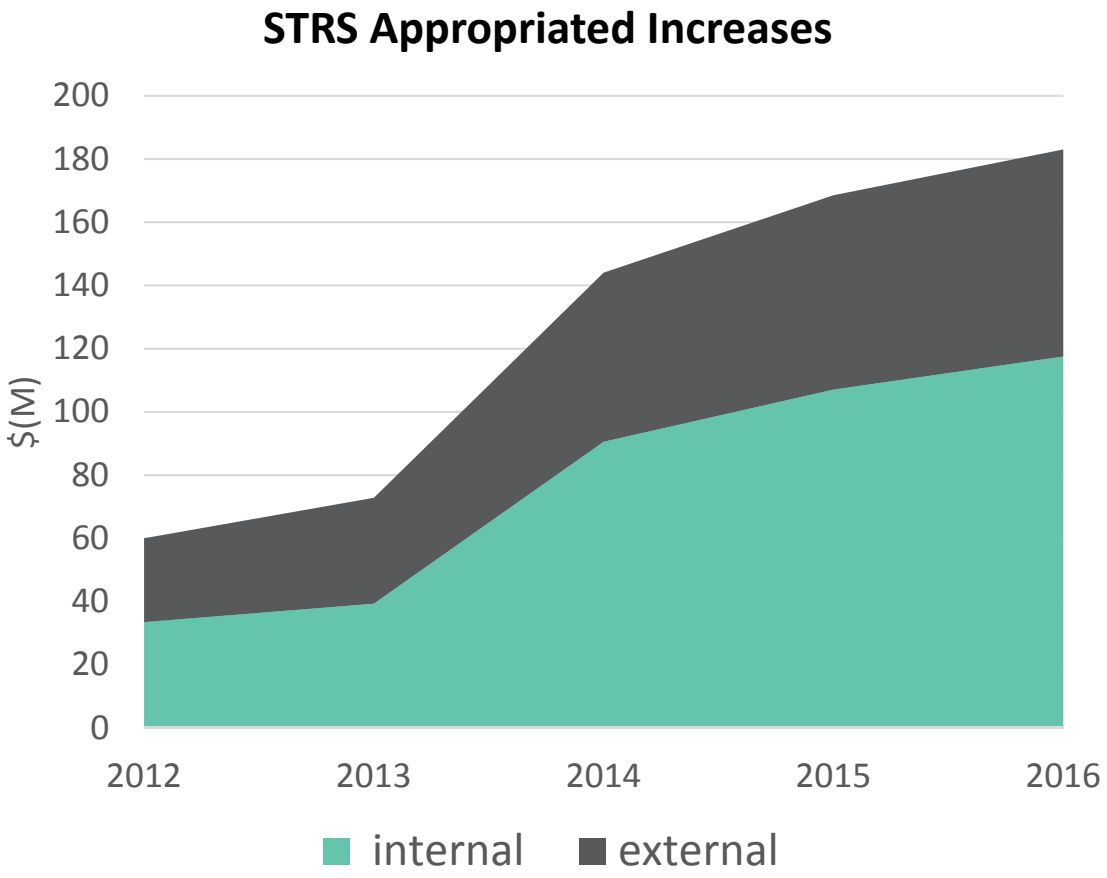
Since 2012
70% of has gone to extramural programs

$74 M today, includes 52% for internal R&D

External programs & mandates:

- National Cybersecurity Center of Excellence (2012)
- National Strategy for Trusted Identities in Cyberspace (2011)
- National Initiative for Cybersecurity Education
- Cybersecurity Framework (2013)
- Cybersecurity Commission (2016)

Significant increases to external programs



Since 2012:

~ 1/3 of STRS increase directed externally

Cyber Convening

Urban Dome (GHG) program

Lab to Market

Resilience Grants

Centers of Excellence

- CHiMaD ($5M)
- Csafe ($4M)
- Center for resilience planning ($4M)

There's more to do…

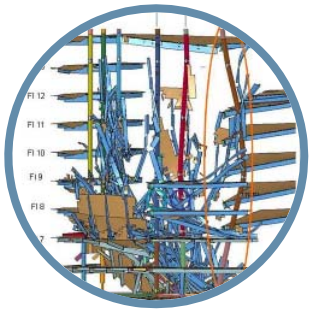
NIST has made great progress, but there's more to be done.

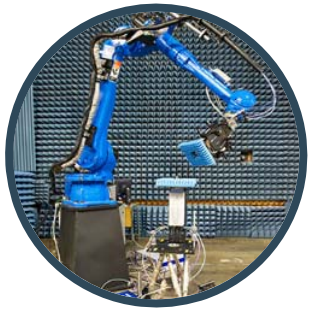
- Several areas have yet to reach critical mass.
- New areas are emerging

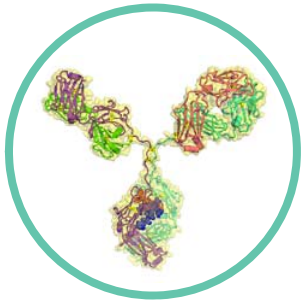
Question to VCAT
Where should NIST focus?

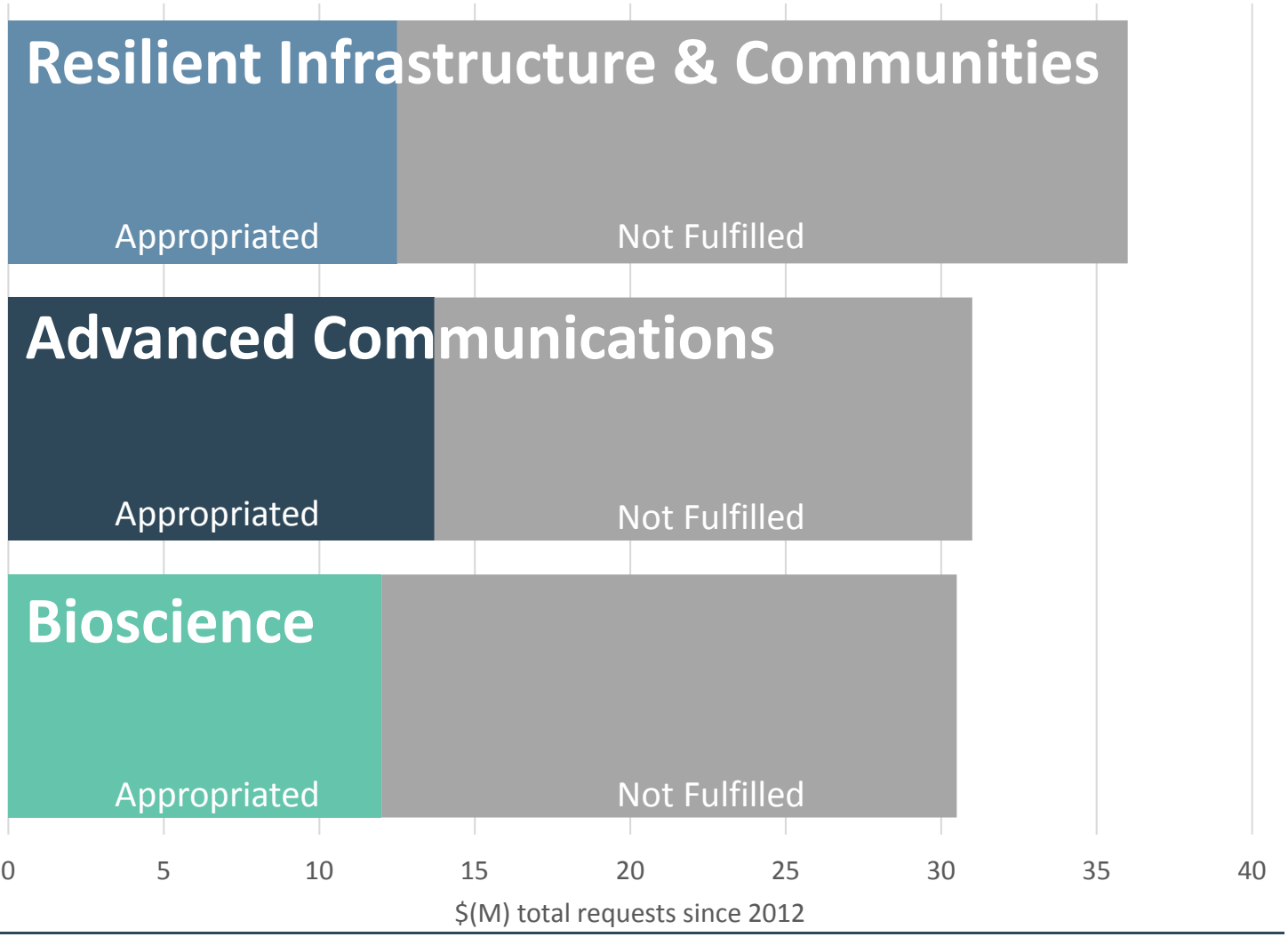
The VCAT reviews and makes recommendations regarding general policy for the National Institute of Standards and Technology, its organization, its budget, and its programs

Room for more growth









Resilient Infrastructure and Communities

$30.5M requested since 2012: +$12M appropriated

- Accomplishments
  - Community Resilience Planning Guide issued, cities engaged in using the Guide
  - Technical investigation of 2011 Joplin tornado yielded building code improvements
  - NIST's Disaster Resilience Center of Excellence (CO State and partners) developing metrics and decision tools
- Possible Future Directions
  - Grow capabilities in disaster and failure studies
  - Wildland-Urban Interface
  - Smart fire fighting
  - Robotic emergency response

Advanced Communications

$31M requested since 2012: +$13.7M appropriated

- Accomplishments
  - Improved wireless coexistence laboratory and measurements
  - Improving antenna measurement laboratory
  - Contributions to wireless measurement standards
  - 5G Millimeter-Wave Channel Model Alliance
  - NASTCN launched three spectrum-sharing projects
- Possible Future Directions
  - Improved coexistence metrics
  - Characterization of new spectrum sharing technologies
  - Spectrum forensics metrology
  - Increased NASCTN capacity
  - Optical communications

Bioscience

$35.5M requested since 2012: +$12.5M appropriated

- Accomplishments

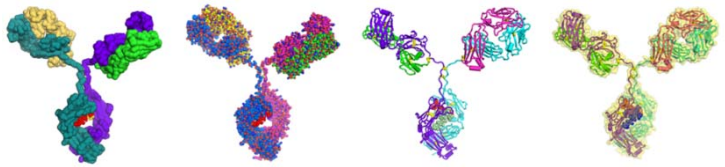
New Partnerships:

- Joint Initiative for Metrology in Biology at Stanford University
- Synthetic Biology Standards Consortium
- Genome in a Bottle Consortium

New Products:

- First-ever Monoclonal Antibody Standard Reference Material
- New calibration system for PET scanners for improved accuracy

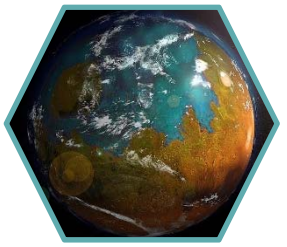
- Possible Future Directions
  - Complex biotherapeutics
  - Engineering biology
  - Microbial science
  - Precision measurements for medicine
  - Biological measurement assurance and quality
  - Nanobiomedicine



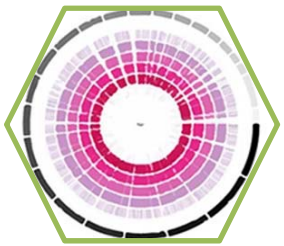
New and emerging topics

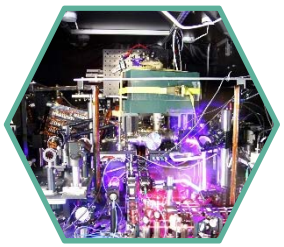
New measurement science to enable:

- New areas
  - Precision medicine
  - Strategic computing
  - Connected measurements
  - Multimodal measurements
  - Testing the standard model
  - Post-quantum crypto
- Emerging areas
  - AI / machine learning
  - Water
  - Infrastructure
  - Complex systems
  - Augmented reality
  - Blockchains










To VCAT

NIST can make an impact when given the right tasks

- NIST has been well supported during the last administration
- More to do - new industries and technologies can benefit from strong NIST capabilities and involvement.
- We can’t do everything - need to prioritize.
- **VCAT can support and guide in prioritization**