

NSF's Big Ideas

Jim Ulvestad
Acting Assistant Director
National Science Foundation
November 16, 2017



10 Big Ideas for Future NSF Investments

- Bold questions that will drive NSF's long-term research agenda
- Catalyze investment in fundamental research
- Collaborations with industry, private foundations, other agencies, universities
- Solve pressing problems and lead to new discoveries



NSF's 10 Big Ideas



MPS leads these two

RESEARCH IDEAS

<p>HARNESSING THE DATA REVOLUTION FUNDAMENTAL RESEARCH MACHINE LEARNING DATA SCIENCE ANALYTICS EDUCATION WORKFORCE</p>	<p>Work at the Human-Technology Frontier: Shaping the Future</p>	<p>Windows on the Universe: The Era of Multi-messenger Astrophysics</p>	<p>The Quantum Leap: Leading the Next Quantum Revolution</p>
<p>Harnessing Data for 21st Century Science and Engineering</p>	<p>Navigating the New Arctic</p>	<p>Understanding the Rules of Life: Predicting Phenotype</p>	

PROCESS IDEAS

<p>Mid-scale Research Infrastructure</p>	<p>NSF 2026</p>
<p>Growing Convergence Research at NSF</p>	<p>NSF INCLUDES: Enhancing STEM through Diversity and Inclusion</p>



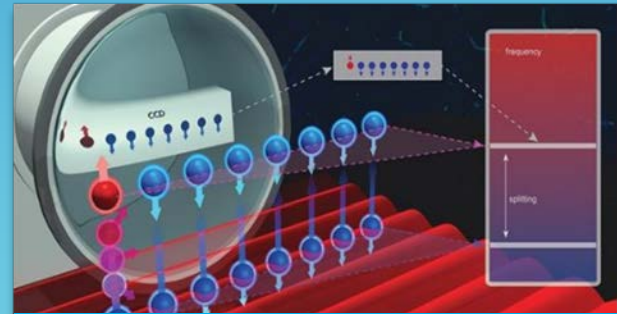
Pushing the Boundaries of Knowledge



Windows on the Universe: The Era of Multi-messenger Astrophysics



Understanding the Rules of Life:
Predicting Phenotype



The Quantum Leap: Leading the Next
Quantum Revolution

Seizing New Opportunities



HARNESSING THE DATA REVOLUTION

Key terms in the word cloud include: MATHEMATICAL, STATISTICAL, COMPUTATIONAL, FOUNDATIONS, ANALYTICS, DATA SCIENCE, MACHINE LEARNING, RESEARCH DATA, MODELING, DATA MINING, FUNDAMENTAL RESEARCH, CYBERSECURITY, DOMAIN SCIENCE, CHALLENGES, SYSTEMS ARCHITECTURE, INTERNET OF THINGS, STATISTICS, REPRODUCIBILITY, INTEROPERABILITY, HUMAN-DATA INTERFACE, RESEARCH DATA, MODELING, DATA MINING, VISUALIZATION, CYBERINFRASTRUCTURE, INTEROPERABILITY, HUMAN-DATA INTERFACE, REPOSITORIES, EDUCATION WORKFORCE, OPEN DISCOVERY, PUBLIC ACCESS, SEMANTICS, INFERENCE, RESEARCH DATA, MODELING, DATA MINING, VISUALIZATION, CYBERINFRASTRUCTURE, INTEROPERABILITY, HUMAN-DATA INTERFACE, REPOSITORIES, EDUCATION WORKFORCE, OPEN DISCOVERY, PUBLIC ACCESS, SEMANTICS, INFERENCE.

Harnessing Data for 21st Century Science and Engineering



Navigating the New Arctic



The Future of Work at the Human-Technology Frontier



Identifying and Closing Gaps



MPS Involvement in the Big Ideas

- Quantum Leap: CHE, DMR, DMS, PHY
- Windows on the Universe: AST, PHY
- Harnessing Data: AST, CHE, DMR, DMS, PHY
- Rules of Life: CHE, DMR, DMS, PHY
- Work at the Human-Technology Interface: DMR, DMS
- Gap/process Ideas: All

Division Reductions in FY18 Request

- All: Core & interdisciplinary research, plus
 - AST: Midscale, instrumentation
 - CHE: CCI, REU, instrumentation
 - DMR: Midscale, facilities, REU
 - DMS: Workforce programs
 - PHY: Midscale
- Note: Some interdisciplinary programs and initiatives rolled off naturally, and were absorbed (to some degree) in core



Question for Discussion

- Noting the reductions in the FY 2018 request, from the previous slide:
- NSF is embarking on a focus on the big ideas as a driver for future investments. How does the MPSAC view the priority of investment in Big Ideas as opposed to investment in existing programs?



Questions/Discussion



Backup Slide: Some Issues

- Timelines under development
- Dependence on funding
- Interests of White House and Congress
- Heterogeneity of MPS Divisions
- Level of readiness of communities
- Capacity of staff to implement
- Relation to Convergence
- Partnerships

