2022 WORKSHOP
POINTS OF EMPHASIS

Tuesday October 27, 2022

Aurali Dade, Program Director
Convergence Accelerator
Directorate for Technology, Innovation and Partnerships
National Science Foundation

ACCELERATING CONVERGENT SOLUTIONS FOR SOCIETAL IMPACT
A Pivotal Moment for the Nation

- Climate change
- Equitable access to education, health care
- Critical and resilient infrastructure
A Pivotal Moment for Science & Engineering

Pace of discovery accelerated by data, emerging technologies

Demand for societal impact

Opportunity to leverage partnerships
MISSION:
To promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense; and for other purposes

VISION:
Envisions a nation that capitalizes on new concepts in science and engineering and provides global leadership in advancing research and education
TIP

Directorate for Technology, Innovation and Partnerships

Creates breakthrough technologies | Meets national needs | Empowers all
CONVERGENCE RESEARCH

Today’s grand challenges will NOT be solved by one discipline working alone.

Grand Challenges require **CONVERGENCE**: the merging of ideas, approaches, and technologies from widely diverse fields of knowledge to stimulate innovation and discovery.
NSF Convergence Accelerator
Accelerating Solutions Toward Societal Impact

MISSION:
The Convergence Accelerator speeds the transition of convergence research into practice to address national-scale societal challenges

VISION:
Convergence research and multi-institutional teams that include users and other stakeholders will provide high-impact results to societies at scale
NSF Convergence Accelerator

Accelerating Solutions Toward Societal Impact

**GOALS:**
- Disrupt the usual way of NSF business through a new innovation model
- Expand and diversifies multidisciplinary teams and partnerships to include academia, industry, non-profits, government, and other sectors
- Deliver solutions that have a national societal impact

**Characteristics**
- Use-inspired research
- Clear goals, milestones, high-impact deliverables
- Leverages multidisciplinary teams
- **Larger, national societal scale**
- Requires **diverse partnerships** – industry, non-profits, academia
- **Acceleration at speed and scale**

**Proactively & Intentionally Managed**
- Teams and Cohorts—“Tracks”
- **Cooperation and Competition**
- Intensive education and mentorship—human-centered design thinking, team science, and customer discovery
- Mission-driven evaluation
## CONVERGENCE ACCELERATOR PROGRAM

### IDEATION

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<th>DCL/RFI</th>
<th>WORKSHOPS</th>
<th>FUNDING OPPORTUNITY</th>
<th>CONVERGENCE RESEARCH FOCUS</th>
<th>SOCIETAL IMPACT</th>
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</table>
| Topics begin by gathering ideas from the community through a Dear Colleague Letter, Request for Information | Promising ideas that meet the program's criteria are further explored in funded workshops | Selected track topics are released in a traditional solicitation and BAA. Awarded projects are selected based on research track focus, acceleration of basic research, multidisciplinary approach and national-scale societal impact. | **PHASE 1**
Selected teams are funded up to $750K for a nine month planning phase |
Teams participate in an innovation curriculum to strengthen collaboration, foster partnerships and transform basic research into high-impact solutions. Teams participate in a formal phase 2 proposal and pitch to be selected for phase 2. | **PHASE 2**
Selected teams are funded up to $5 million for a 24 month solution development phase. Teams participate in an idea-to-market curriculum to unleash an entrepreneurial mindset and skill set and to ensure each project reaches its full potential. |
| | | | National-scale Sustainable beyond NSF support may include: |
| | | | Follow-on funding and investment |
| | | | Integration into existing system |
| | | | Tools/knowledge accessible through open source |
| | | | Solutions expanded into new markets |

### PHASE 1

- Promising ideas that meet the program's criteria are further explored in funded workshops.
- The workshop findings assist NSF in selecting future convergence research track topics.

### PHASE 2

- Selected teams are funded up to $5 million for a 24 month solution development phase.
- Teams participate in an idea-to-market curriculum to unleash an entrepreneurial mindset and skill set and to ensure each project reaches its full potential.

### FUNDING OPPORTUNITY

- Selected track topics are released in a traditional solicitation and BAA.
- Awarded projects are selected based on research track focus, acceleration of basic research, multidisciplinary approach and national-scale societal impact.

### SOCIETAL IMPACT

- National-scale Sustainable beyond NSF support may include:
  - Follow-on funding and investment
  - Integration into existing system
  - Tools/knowledge accessible through open source
  - Solutions expanded into new markets
CONVERGENCE ACCELERATOR EXAMPLE

2021 Cohort: Ideation to Convergence Research

IDEATION

DCL/RFI
DCL/RFI
NSF 20-061
Focused on gathering convergence research topics for FY 2021
NSF receives 180+ ideas

WORKSHOPS
Funded 12 workshops on a variety of topics to be further developed.
Two workshop topics were chosen for the 2021 solicitation:
• Track E: Networked Blue Economy
• Track F: Trust & Authenticity in Communication Systems

FUNDING OPPORTUNITY
NSF releases two solicitations in parallel:
• Traditional: NSF 21-572
• Broad Agency Announcement: NSFBAA-CA21-01
NSF receives 200+ proposals

CONVERGENCE RESEARCH FOCUS

PHASE 1
NSF awards 28 teams launching the 2021 Cohort:
• 16 Track E teams
• 12 Track F teams
Phase 1 teams:
• Participate in the innovation curriculum
• Develop the initial concept
• Identify new team members/partners
• Participate in a formal phase 1 proposal and pitch presentation
• Participate in EXPO 2022

PHASE 2
Begins October 2022

SOCIETAL IMPACT
Begins Summer 2024
IDEATION (DCL/RFI, WORKSHOPS):
Selected by gathering input from the community. Identified topics must meet a societal need at scale, be built upon foundational research, and be suitable for a multidisciplinary, convergence research approach.

PHASE 1 (PLANNING):
Up to $750K over 9 months is provided to further develop the initial concept (building upon basic research), identify new team members/partners, participate in a hands-on innovation curriculum, and develop an initial/low-fidelity prototype.

PHASE 2 (IMPLEMENTATION):
Up to $5M over 24 months to develop solution prototypes and to build a sustainability model to continue impact beyond NSF support.
Convergence Accelerator Portfolio

**Track A**
Open Knowledge Networks

**Track B**
AI and the Future of Work

**Track C**
Quantum Technology

**Track D**
AI-Innovation Data Sharing & Modeling

**Track E**
Networked Blue Economy

**Track F**
Trust & Authenticity in Communication Systems

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**2019 COHORT**
Phase 2

**2020 COHORT**
Phase 2

**2021 COHORT**
Phase 1

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**Track G**
Securely Operating Through 5G Infrastructure

**Track H**
Enhancing Opportunities for Persons with Disabilities

**Track I**
Sustainable Materials for Global Challenges

**Track J**
Food & Nutrition Security

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**2022 COHORT**
2023 Cohort Track Topics – TBD

If selected as a topic for the 2023 solicitation, this workshop report will be used as a reference for the community so make sure it’s as clear, concise, and comprehensive as possible.
Convergence Accelerator Workshop Charge–Points of Emphasis

As you engage in the workshop discussion, keep in mind the following aspects of the Convergence Accelerator:

**Convergence:** Multiple disciplines with a focus on social science aspects; think big—don’t just include experts from a single institution or discipline

**Cross-cutting Partnerships:** Multiple disciplines, organizations, and sectors; not just academia; must include industry, non-profits, government, and other communities of practice

- Diverse partnerships provide valuable expertise and insights to position the deliverable for success.
- Multidisciplinary approach (different sectors and expertise)
- Use-inspired research (end-user and prototyping research)

**Broadening Participation:** Must include the participation of underrepresented groups (e.g., expertise, partnerships, user groups, resource needs)
Convergence Accelerator Workshop Charge–Points of Emphasis Continued

As you engage in the workshop discussion, keep in mind the following aspects of the Convergence Accelerator:

**Deliverables:** What can be delivered to the American people in 3 years, (e.g., Prototypes); What impact will the solutions have on a national scale?

- Research papers are **not** sufficient.
- Deliverables do not have to result in commercialization, but they must be useful and needed tools, test beds, living labs, etc.

**Track Alignment:**

- How can multiple funded teams work together to solve a national-scale complex challenge?
- Each track funds a set of diverse teams focusing on different aspects of a national-scale societal challenge
- Teams are uniquely positioned to ensure the highest societal impact
CONVERGENCE ACCELERATOR PROGRAM TIMELINE

Overall Timeline – 2019–2023

**Pilot 2019 Cohort**

- **Phase 1**: Open Knowledge Networks (Track A) and Future of Work (Track B)

**2020 Cohort**

- **Phase 1**: Quantum Technology (Track C) and AI-Driven Innovation (Track D)

**2021 Cohort**

- **Phase 1**: Networked Blue Economy (Track E) & Trust & Authenticity in Communication Systems (Track F)

**2022 Cohort**

- **Phase 1**: 2022 Cohort Track G
- **Phase 2**: 2022 Cohort Tracks H, I, & J

**2023 Cohort**

- **Phase 1**: 2023 Cohort Tracks K & L*

* Topics selected based on community readiness and Administration priorities
## Workshop Themes for 2023 Track Topics

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<tr>
<th>Topic</th>
<th>Workshop</th>
<th>Workshop Details</th>
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| **AI Safety**                 | **Ethical Design of AIs**, led by University of Maryland, College Park, PI: Louiqa Raschid (Award ID: 2232404) | **Dates/Times:** September 29, October 6, and October 20, 2022 from 12 - 3:30 p.m. ET  
**Website:** go.umd.edu/EDAIs |
|                               | **Provably Safe and Beneficial Artificial Intelligence Workshop (PSBAI),** led by University of California, Berkeley, PI: Stuart Russell (Award ID: 2230996) | **Dates:** October 7-9, 2022  
**Website:** humancompatible.ai/psbai-workshop-2022/ |
| **Bio-Informed Design/ Bioengineering** | **Bio-inspired Design**, led by Syracuse University, PI: Lisa Manning, (Award ID: 2232327) | **Dates:** October 3-4, 2022  
**Website:** bioinspired.syr.edu/nsf-convergence-accelerator-workshop-bioinspired-design |
| **Chemical Sensing Innovation** | **Chemical Sensing with an Olfaction Analogue: High-dimensional, Bio-inspired Sensing and Computation**, led by Texas A&M University, PI: Ricardo Gutierrez-Osuna, (Award ID: 2231512) | **Dates/Times:** October 7, 2022 from 8 – 10 a.m. CT, October 11, 2022 from 8 a.m. – 12 p.m. CT, October 13 from 8 a.m. – 12 p.m. CT, and October 14 from 8 a.m. – 12 p.m. CT.  
**Website:** psi.engr.tamu.edu/olfaction-workshop |
|                               | **Frontiers in Chemical Sensing: Synthetic, Neuromorphic and Cyborg Systems**, led by Washington University, PI: Barani Raman, (Award ID: 2231528) | **Dates/Times:** October 18 from 1 – 3 p.m. ET and October 24, 2022 from 1 - 5 p.m. ET  
**Contact:** Baranidharan Raman (Principal Investigator) barani@wustl.edu |
| **Citizen Science for Community Resilience** | **Community Science and Resilience**, led by American Geophysical Union or AGU, PI: Raj Pandya (Award ID: 2231692) | **Dates/Times:** October 7, 2022 from 11 a.m. – 3 p.m. ET  
**Website:** resiliencethruscience.org |
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<td>Computing Solutions to Climate-Driven Extreme Events&lt;br&gt;Building Resilience to Climate Driven Extreme Events with Computing Innovations, led by University of Colorado, Boulder, PI: Elizabeth Bradley, (Award ID: 2232193)</td>
<td>Dates/Times: October 27, 2022 at 12 p.m. MDT, October 28, 2022 at 1 p.m. MDT and November 10, 2022 from 12 – 3:15 p.m. EST.&lt;br&gt;Website: • In-Person workshop • Virtual event</td>
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<td>Transforming Educational Technology Through Convergence, led by the University of Pennsylvania, PI: Ryan Baker (Award ID: 2231524)</td>
<td>Dates/Times: October 3, 2022 from 1-3 p.m. ET, November 4, 2022 from 1-3 p.m. ET and mid-late October meeting scheduled by each sub-group</td>
<td>Website: <a href="http://www.the-learning-agency.com/nsf-convergence-accelerator-virtual-conference-2022">www.the-learning-agency.com/nsf-convergence-accelerator-virtual-conference-2022</a></td>
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<tr>
<td>Climate Resilience and Managing Water Resources, led by the Indiana University, PI: Benjamin Kravitz, (Award ID: 2231916)</td>
<td>Dates/Times: October 13, 2022 from 1 – 3 p.m. ET and October 17, 19, and 21, 2022 from 1 – 5 p.m. ET</td>
<td>Website: <a href="https://earth.indiana.edu/research/workshops/water-resources.html">https://earth.indiana.edu/research/workshops/water-resources.html</a></td>
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**TIP: Accelerating Research Toward Impact**

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<th>Fostering Innovation and Technology Ecosystems</th>
<th>Establishing Translation Pathways</th>
<th>Partnering to Engage the Nation's Diverse Talent</th>
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<td>Nurtures regional and national innovation and technology ecosystems to support researchers and innovators to converge, develop and accelerate use-inspired research for societal impact.</td>
<td>Supports startups through a lab-to-market platform and establishes new pathways for translating research results for society.</td>
<td>Advances and deepens high-impact, public and private partnerships across all areas of science, engineering and education to cultivate innovation ecosystems, create technology solutions, and support future STEM leaders.</td>
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• America’s Seed Fund powered by NSF (SBIR/STTR)
• Convergence Accelerator
• Innovation Corps (I-Corps™)
• Partnerships for Innovation (PFI)
• Pathways to Enable Open-Source Ecosystems (POSE)
• Regional Innovation Engines (NSF Engines)
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