NSF Convergence Accelerator

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Convergence Research

The grand challenges of today will **NOT** be solved by one discipline working alone.

They require *convergence*: the merging of ideas, approaches and technologies from widely diverse fields of knowledge to stimulate innovation and discovery.
Convergence Accelerator

**WHY:** Leverage the science across all fields of NSF research to produce outcomes in an accelerated timeframe, with streamlined operations allowing for nimbleness to support the most innovative results.

**WHAT:** A new organizational structure to *accelerate* the transition of convergence research into practice, in areas of national importance.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Management</th>
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<tr>
<td>Use-inspired research</td>
<td>Time-limited “tracks”</td>
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<td>Testbeds, tools, living labs...</td>
<td>Teams and Cohorts</td>
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<td>Larger, national scale</td>
<td>Cooperation and Competition</td>
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<td>Requires partnerships with industry</td>
<td>More directed management</td>
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<td>Clear goals, milestones, directed deliverables</td>
<td>Mission-driven evaluation</td>
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Convergence Accelerator Pilot Tracks

**Track A1**
- **Goal**: Enhancing scientific data discovery and use
- **Track**: Open Knowledge Networks
- **Big Idea**: Harnessing the Data Revolution

**Track B1**
- **Goal**: Connecting, retraining and reskilling for jobs using AI
- **Track**: AI & Future Jobs
- **Big Idea**: Future of Work at the Human Technology Frontier

**Track B2**
- **Goal**: Building STEM talent in a changing workplace
- **Track**: National Talent Ecosystem
- **Big Idea**: Future of Work at the Human Technology Frontier

**Vertical**: Challenges *specific to different topical domains* such as geosciences, education, smart health, finance, and manufacturing.

**Horizontal**: Challenges that *apply to all domains*, such as developing the underlying representation of facts or developing secured access capabilities.
Accelerator “Track A1”: HARNESSING THE DATA REVOLUTION

- Advanced science data infrastructure that is interoperable and has an open architecture (makes it easier to access and link heterogeneous data products)
- Open Knowledge Network – an open semantic information infrastructure to discover new knowledge from multiple disparate knowledge sources
- Create a nonproprietary shared knowledge infrastructure, with a particular focus on publicly available U.S. Government and similar public datasets. Challenges include underlying representation of facts, services that perform reasoning tasks, and secured access. Domains include geosciences, education, smart health, and manufacturing.
Accelerator “Tracks B1 and B2”:
FUTURE OF WORK AT THE HUMAN-TECHNOLOGY FRONTIER

- **AI and Future Jobs.** The AI and Future of Jobs track will support the development of mechanisms that connect workers with jobs of the future, reflecting the need for re-skilling and lifelong learning, such as predictive artificial intelligence tools, economic and labor market analyses of needed skills for future workplaces, and educational technologies needed for adult learning. Ensuring fair and ethical treatment of workers will be a key principle for this effort. Projects may be focused on particular industries or regions, specific populations such as veterans, or particular workplace types such as small businesses, manufacturing, or K-12 schools.

- **National Talent Ecosystem.** Innovative approaches for employers to support workers seeking the skills required for 21st century work related to data science, predictive analytics, AI/machine learning, and other technologies of the future. Successful projects will prototype innovative approaches, such as learning environments, simulations and tools for analysis or assessment, and vehicles for recruitment and engagement, with the potential for wider implementation by industry, educational institutions, and other stakeholders engaging in the co-creation of a national talent ecosystem.
2019 Convergence Accelerator Pilot Awards

- 43 Awards
- 21 Track A
- 22 Track B

19 States plus District of Columbia
Projects should
• Seek “track integration”;
• Collaborate with industry;
  • Encouraged to collaborate/link with other relevant efforts in the community
Track B1/B2 - Clusters

**Worker-Work Matching**

- **Existing Qualifications:**
  - Education
  - Skills
  - Certificates

- **Prospective Employee**:
- **Prospective Employer**:

**Curricula and Skills Training Development**

- **Existing needs:**
  - Positions
  - Skill requirements
  - Locations

- **Future needs:**
  - Emerging jobs
  - Growth projections
  - Market demands

**Workforce Training and Education Recommendations**

- B6947 – National microcredential system
- B7063 – Microcredential system for industrial robotics technicians
- B6992 – AI-enabled assessment + training plan for displaced miners
- B7037 – AI-driven skill gap diagnostics + recommendation engine for manufacturing
- B7010 – Assessment/Prediction/Learning – smart sensing/mixed reality
- B6968 – Machine learning based tools for gig economy workers
- B6956 – AI-driven tool for career management in STEM fields
- B7888 – Fostering a diverse AI workforce

**Education/Training**

- B6894 – Upskilling/reskilling for digital technologies
- B6656 – Design based research + analytics identifies skill gaps and designs training
- B7833 – Deep learning predicts future jobs + training for hospitality industry
- B6915 – Deep learning predicts future jobs + training for manufacturing
- B6997 – Training platform for autonomous systems
- B7053 – Advanced robotics for training next gen emergency responders
- B7019 – Cloud-based platform trains for future jobs in architecture, construction
- B7061 – Develops ROI measurement for training programs for policymakers
- B7036 – Low cost AR training content development platform for SMEs

**B7026** – Machine learning-based national labor market information tools
**B6970** – AI+AR platform for autism spectrum disorder workers
**B6857** – AI-based job matching – veterans, disabled workers
**B7068** – Documents competencies at the national level
**B7118** – Connects data exchanges at state level
Timeline – Phase 1 and the Future

### 2019 Pilot Cohort

- Accelerator
- DCL issued
- Phase 1 Proposals
- Projects Start!
- Innovation Curriculum
- Pitch Competition
- Projects Start
- Year 2 Decision
- Deliverables

#### Phase 1: Team formation, res. plan dev

- Mar 2019
- Jun 2019
- Sep 2019
- Dec 2019
- Mar 2020
- Jun 2020
- Sep 2020
- Dec 2020

#### Phase 2: Creating Deliverables

- Jun 2021
- Jun 2022

### 2020 Cohort: new tracks

- RFI: 75 responses submitted
- 2020 Topic Workshops
- 2020 Solicitation
- RCOs
- Projects Start
- Phase 1 Proposals
- Innovation Curriculum
- Pitch Comp
- Projects Start
- Year 2 Decision

- Jun 2021
- Jun 2022
Program Structure: Phase I – Planning

• September 2019 – May 2020 (March 2020)
• Upto $1M for ~9 months, for planning, team formation, participating in meetings and Convergence Accelerator curriculum

• CA Curriculum
  • User-centered design. Provided by IDEO.
  • Team Science
  • Domain-specific interactions with potential collaborators

• Teams are assigned a coach from a team of coaches
  • Can meet with any of the other coaches, if they wish.
Phase I – Planning...

• Monthly meetings with the full cohort (43 teams x 3 per team)
• September 2019: Webinar
• October 2019: Kickoff in DC. Interaction with government agencies.
• November 2019: Webinar
• December 2019: Face-to-face in San Francisco. Interact with industry.
• January 2020: Webinar
• February 2020: Face-to-face in San Francisco. Interact with foundations, VCs
• March/April 2020: Submit Phase II proposal
• April/May 2020: Make a “pitch” to a group from NSF, other potential funders, Foundations, VCs, ...

Phase II – Implementation

• June 2020-May 2022. Upto $5m ($3M + $2M)