Convergence Accelerator

ACCELERATING SOLUTIONS TOWARD SOCIETAL IMPACT

Pradeep Fulay & Lara Campbell
Program Directors
NSF Convergence Accelerator

Wednesday, October 27, 2020, 1:00 PM

NSF Convergence Accelerator

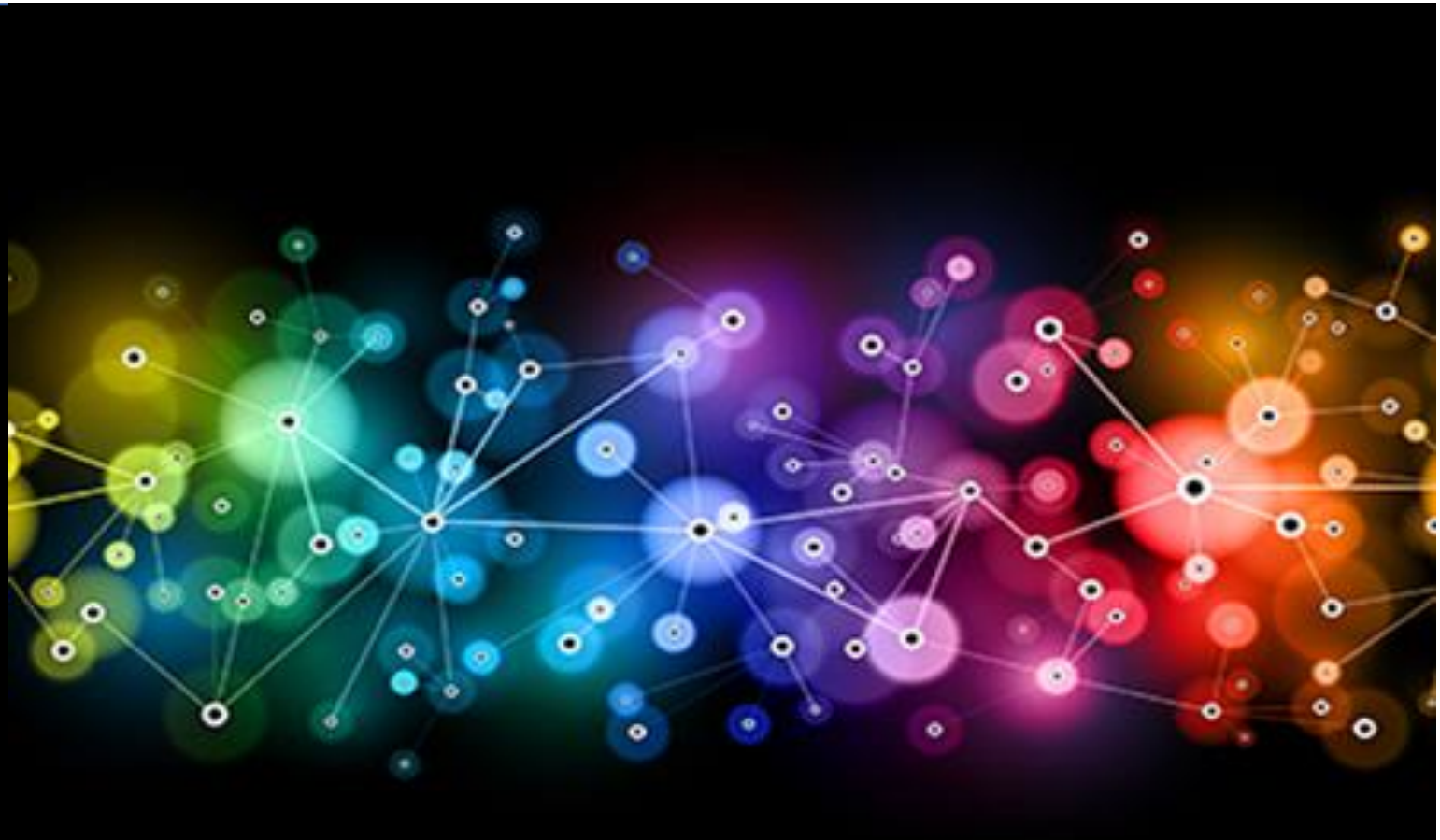
- **Overview:** Model, fundamentals, and innovation processes
- **Program Status:** Latest updates
- **Examples:** Recently funded projects
- **Opportunities:** How can GUIRR members get involved?

https://www.nsf.gov/od/oia/convergence-accelerator/

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

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

Vision: The Convergence Accelerator envisions the innovation model—convergence research and multidisciplinary teams—will provide high-impact results to societies at scale.

Characteristics

- Use-inspired research
- Clear goals, milestones, high-impact deliverables
- Leverages multidisciplinary teams
- Larger, national scale
- Requires diverse partnerships – industry, non-profits, academia

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 Team

Doug Maughan
Office Head

Chaitan Baru
Sr. Science Advisor

Cody Bowles
Program Analyst

Lara Campbell
Program Director

Pradeep Fulay
Program Director

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Linda Molnar
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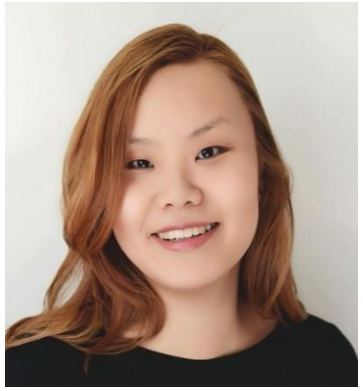
Program Director

Shelby Smith
Communications
& Outreach Lead



Fen Zhao
Expert

NSF Convergence Accelerator Model

Ideation Process

- Begins with a released RFI to solicit ideas
- Selected ideas will be invited to submit a workshop proposal
- Workshops are created to further the ideas
- Final workshop results/reports assist NSF in selecting future track topic(s)

Convergence Research Focus

- Chosen track topics are released in a program solicitation
- Selected awards focus on accelerating basic research into practice
- Leverage multidisciplinary approach, partnerships

PHASE I

- Funding up to $750K
- Nine months planning phase
- Teams participate in innovation curriculum
- Pitch competition and proposal evaluation

PHASE II

- Funding up to $5M
- 24 months solution development phase
- Focused on impact deliverables (e.g., solution prototype, sustainability plan)

Societal Impact

- National-scale
- Sustainability beyond NSF support may include:
  - Follow-on funding and investment
  - Integration into existing systems
  - Tools/knowledge accessible thru open source
  - Solutions expanded into new markets

NSF Convergence Accelerator | Program Structure

- **Convergence Accelerator Ideation:** 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 I (Planning)**: Up to $750K over 9 months is provided to further develop the initial concept, identify new team members/partners, participate in innovation curriculum, and develop an initial prototype.
- **Phase II (Implementation)**: Up to $5M over 24 months to develop solution prototypes and to build a sustainability model to continue impact beyond NSF support.

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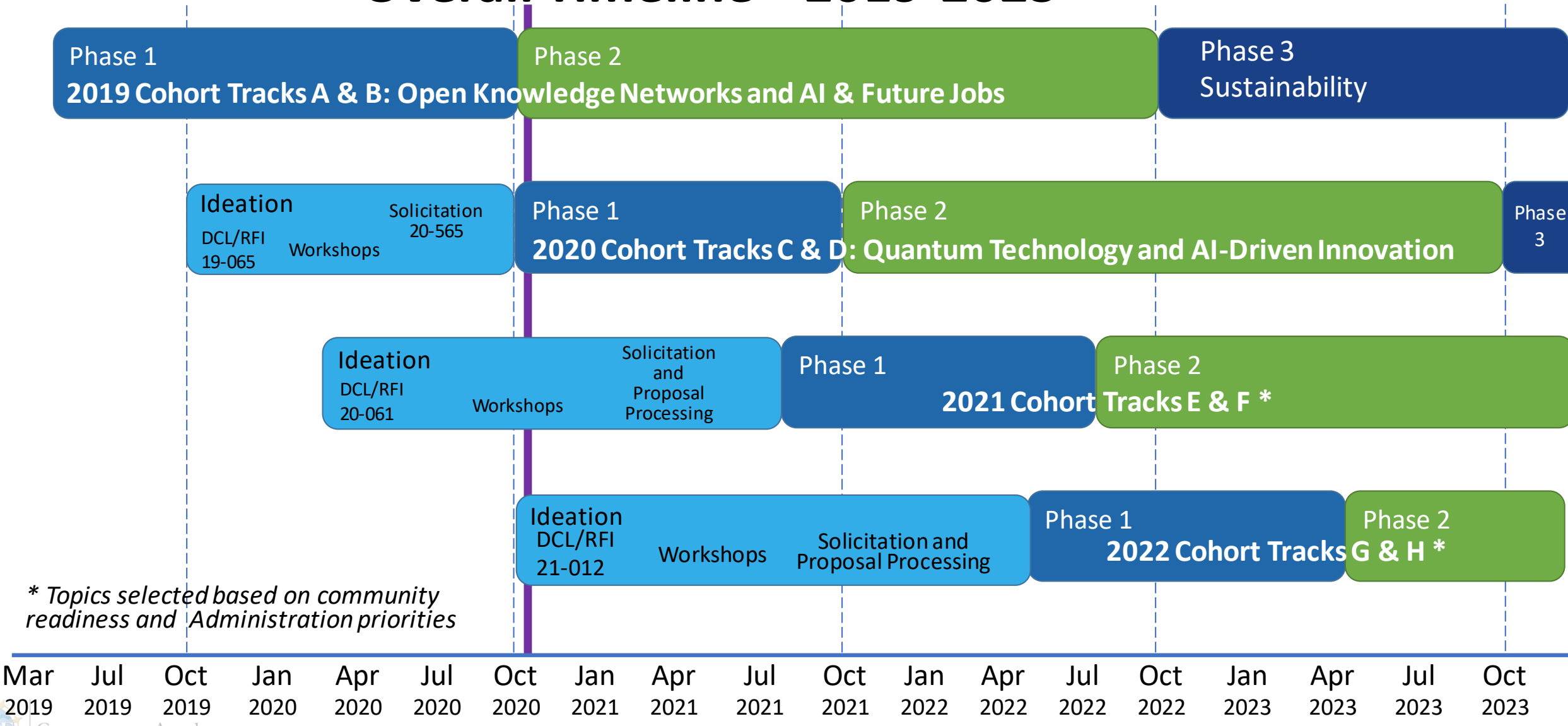
Convergence Accelerator Program Overall Timeline – 2019-2023



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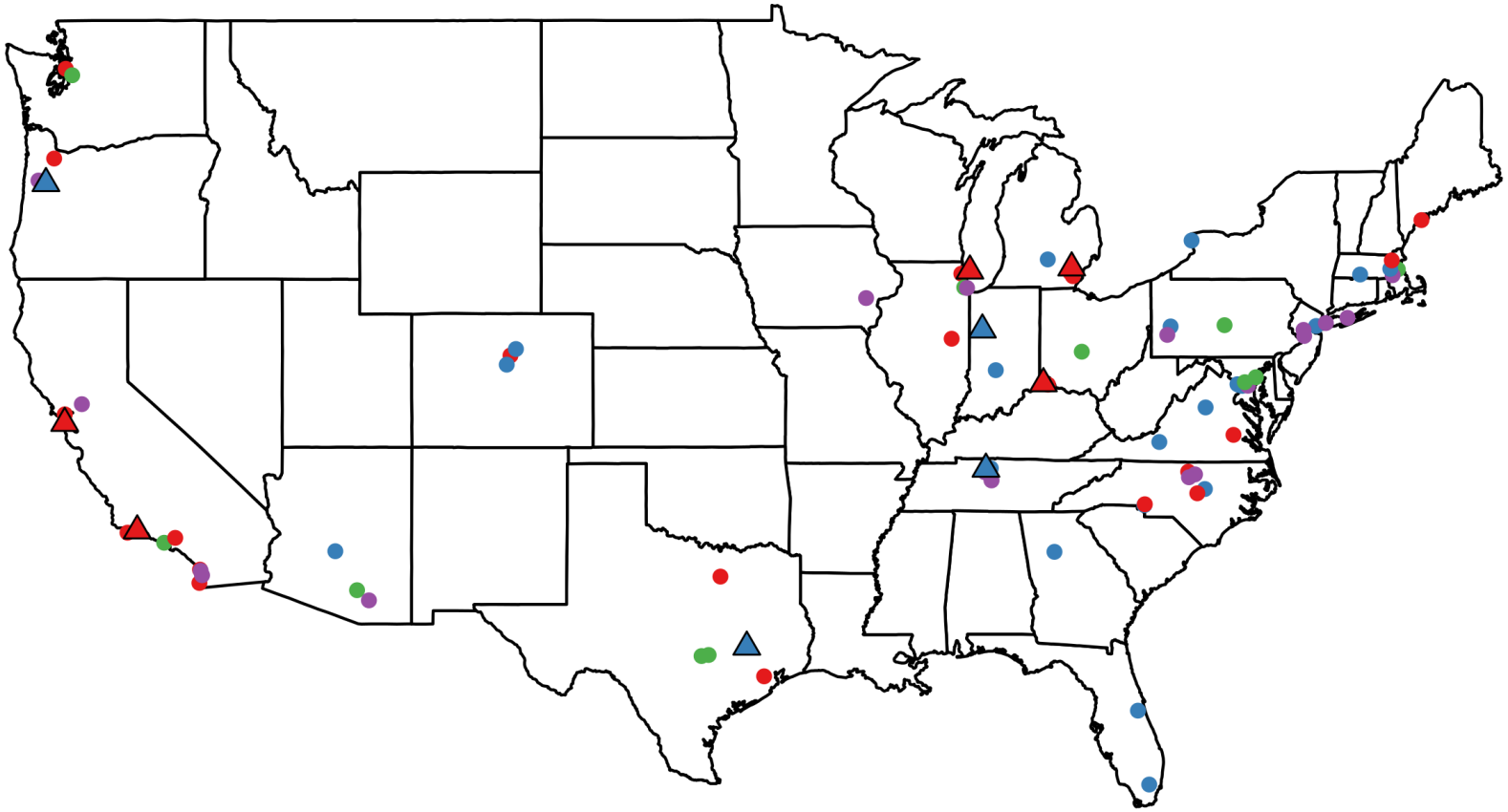
Convergence Accelerator Research Portfolio



Cohort	Track	Phase I Awards	Phase II Awards
2019	Open Knowledge Networks (Track A)	● 21	▲ 5
	The Future of Work (Track B)	● 22	▲ 4
2020	Quantum Technology (Track C)	● 11	
	AI Driven Data & Model Sharing (Track D)	● 18	

NSF Convergence Accelerator

Track A: Open Knowledge Networks (OKN)

- **National Challenge:** improving data-driven discovery, decision making
- **Overarching Goal:** Develop an OKN tool to enable better use of data
  - Building tools to identify, harvest, and incorporate data sets into the network
  - Building elements of the OKN to address societal challenges

Track A Sub-topic Solutions

Addressing Societal Challenges

- Civil infrastructure, urban flooding, energy systems
- Environmental, ocean resources, spatial decisions support
- Healthcare (e.g., precision medicine, molecular properties)
- Public policy, court records
- Space sciences

Building Tools

- Application development environment
- Data extraction, integration, models, methods
- Federated search
- Information credibility
- Internet structure, security

Lara Campbell, Track A Program Director, lcambel@nsf.gov

UF-OKN

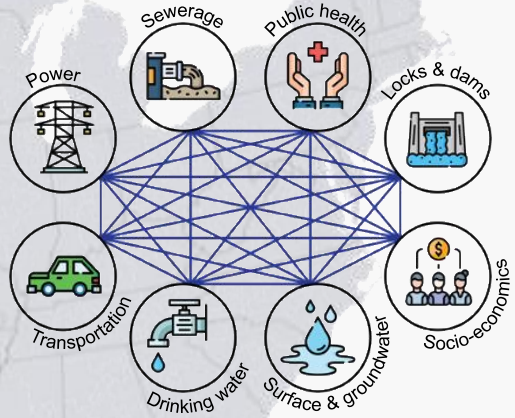
The Urban Flooding Open Knowledge Network

DELIVERING FLOOD INFORMATION TO ANYONE, ANYTIME, ANYWHERE™

CLICK OR SCAN TO WATCH VIDEO

Disconnected Urban Systems at National Scale

UF-OKN



Fully Connected Urban Multiplex (UM) at National Scale

Flood Forecast

Homebuyer: Is this neighborhood flood prone?

Stormwater Manager: Which one of the pumping stations will be inoperable?

Federal Agency: Where can I find standardized data on national scale?

Private Citizen: Will my house get flooded?

Emergency Responder: What areas of my city are at risk?

DEVELOPERS

University of Cincinnati · Purdue University · Virginia Tech · NC State University · CUAHSI · Woods Hole Oceanographic · Illinois · Utah State University · UC Santa Barbara · University of Maine · Streamline Technologies

PARTNERS

Internet of Water · University of Virginia · Pinellas County · Orange County Government Florida · Brevard County · Roanoke · NOAA · Microsoft · Pacific Northwest · The University of Iowa · Northern Arizona University · LWDD · Orlando Stormwater Services · Duke Energy · Lamar University · Arizona State University · Lee County Southwest Florida · Minneapolis City of Lakes · St. Johns River Water Management District · College of Charleston · Clemson University · Metropolitan Sewer District of Greater Cincinnati · Raleigh · Wilmington · NIST · EPA · USGS science for a changing world

ADVISORS

FEMA · U.S. Army Corps of Engineers · Department of Transportation · dc water is life · NASA Jet Propulsion Laboratory · ASS Scholars Consulting LLC · WEST Consultants, Inc. · Dewberry · TEXAS

INTERESTED IN OUR PROJECT?

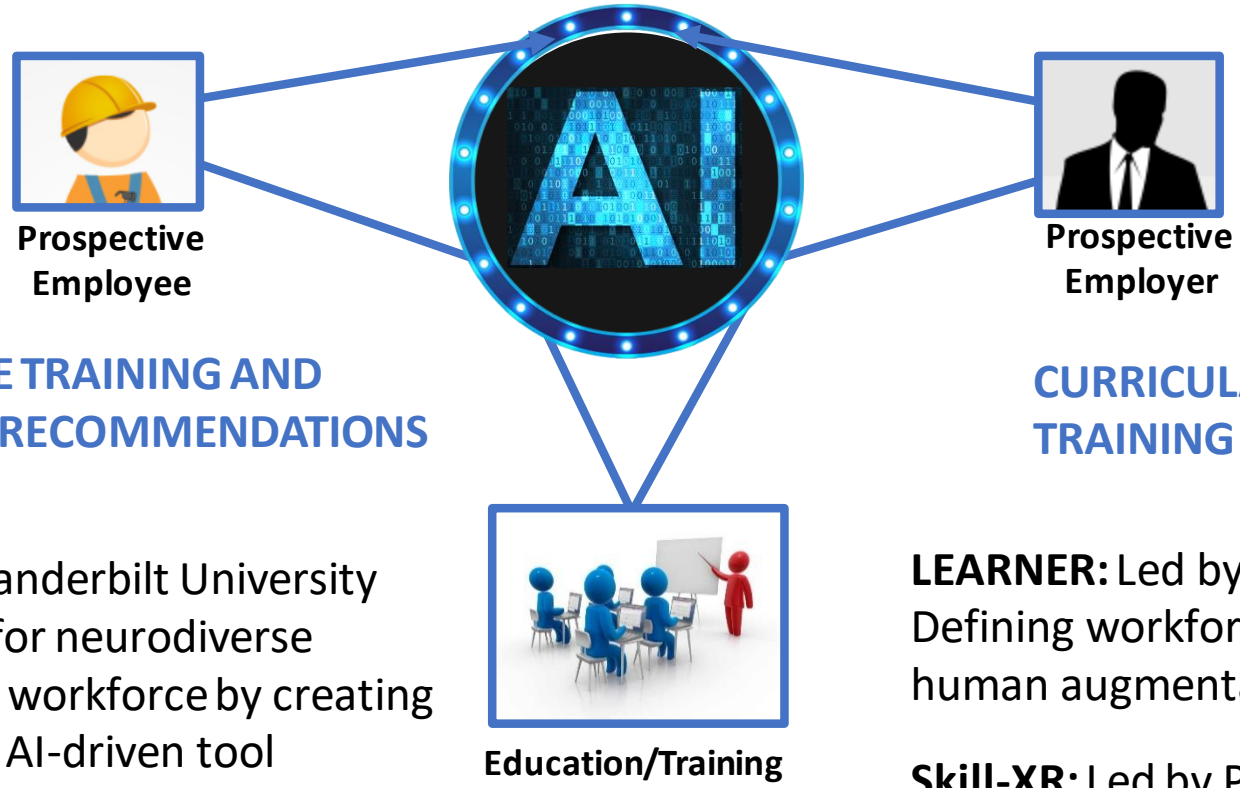
Contact us at Lilit.Yeghiazarian@uc.edu

NSF · UF-OKN

Track B: Future of Work

WORKER-WORK MATCHING

SkillSync: Led by Eduworks Corporation
Developing the U.S. talent pipeline through competency-based training intelligent tools to enable companies; providing needed skills to academic institutions to prepare students for the workforce



WORKFORCE TRAINING AND EDUCATION RECOMMENDATIONS

NeuroAI@Work: Led by Vanderbilt University
Creating a talent pipeline for neurodiverse individuals to thrive in the workforce by creating a virtual reality simulation AI-driven tool

CURRICULA AND SKILLS TRAINING DEVELOPMENT

LEARNER: Led by Texas A&M
Defining workforce training and safety through a human augmentation technology prototype

Skill-XR: Led by Purdue University
Upskilling and reskilling workers for industry needs using virtual/mixed reality apps

Linda Molnar, Track B Program Director, lmolnar@nsf.gov

SkillXR
B7036

Making augmenting human skills a reality

PURDUE UNIVERSITY

UNIVERSITY OF CALIFORNIA · IRVINE · LET THERE BE LIGHT

UNIVERSITY OF MARYLAND 18 56

RIT Rochester Institute of Technology

Personalized Training Platform
(Manufacturing Education)

Task Analytics Across
Space and Time

Personalized Task Platform
(Manufacturing Floor / In-Field)

COOK MEDICAL

NVIDIA

Delta Welding Supply

WABASH NATIONAL

GAYLOR ELECTRIC

Encyclopædia Britannica

the strong NATIONAL MUSEUM OF PLAY

and more...

Track C: Quantum Technology

11 Phase I Teams

- Sensing
- Simulators
- Interconnects
- Architecture
- Workforce Education

Pradeep Fulay, Track C Program Director
pfulay@nsf.gov

Track D:
AI-Driven Innovation via Data and Model Sharing

18 Phase I Teams

- Data Centric and Model Centric
- Curation and sharing of open as well as sensitive/protected data
- Dealing with issues related to sensitive data, privacy and data sanitization
- Address ethics, fairness, and bias issues associated with research data

Mike Pozmantier, Track D Program Director, mpozmant@nsf.gov

Track D Example – Scalable Environmental Monitoring

- **National-scale Societal Challenge:** Monitoring the earth's biome by trapping and analyzing mosquitoes to detect pathogens/diseases that may cause large epidemics
- **Solution Development:** Building upon Microsoft's Premonition technology to continuously monitor the environment to detect pathogens and disease-carrying animals before they cause outbreaks
- **Partners:** Vanderbilt University, Johns Hopkins University, University of Pittsburgh, University of Washington, Harris County Texas, and Microsoft

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What's in it for GUIRR?

- **Partnership Opportunities:**
  - **Ideation process:** Propose ideas for future topics; if selected lead a workshop to future the proposed idea
  - **Convergence Research:** Significant funding opportunities to lead and/or participate in Convergence Accelerator research projects
  - **Cross-cutting Partnerships:** Help with acceleration!
- **Explore:**
  - Possibilities with on-going Track A, B, C or D projects
  - Participate in Convergence Accelerator Expo to identify opportunities for licensing or help develop IP

Cross-cutting Partnerships

Two approaches to partnerships:

- **PI-identified partners:** identified by teams, integrated into Phase 1 proposals
- **NSF-identified partners:** proactively engaged by NSF Convergence Accelerator staff
- Industry partners may lead the projects

Convergence Accelerator Model - Ideation - RFI DCL 21

- **Societal Impact Opportunity:** Research/Innovation communities to provide future topic ideas
- **Who can submit:** Researchers/Innovators from academia, industry, non-profit, government, etc. may submit ideas
- **Ideas must:**
  - Be broad in scope that necessitates multiple teams working together in a cohort
  - Have the potential for national-scale societal impact (e.g., Industries of the Future, NSF Big Ideas)
  - Emphasize convergence research (e.g., multidisciplinary collaboration, partnerships)
- **To submit ideas, visit:** http://bit.ly/NSF-21-012

Responses Due November 9, 2020

Explore the Possibilities

- **Connect with Convergence Accelerator funded research teams**
  - Track A & B Phase I and Phase II Teams
  - Track C & D Phase I teams
- **Participate in Convergence Accelerator Public Events**
  - Webinar for RFI just after this event (2 p.m. – 3:30 p.m. ET) or watch a recording of last week's RFI webinar.
  - EXPO Spring 2021 will highlight all funded projects with virtual booths
- **End Goal: Collaborations that lead to more impactful outcomes.**

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Convergence Accelerator

CONNECT WITH US

www.nsf.gov/od/oia/convergence-accelerator

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