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General Comment

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Attachments

University of Cincinnati Response to Docket ID No. NSF-2025-OGC-0001

Recommendations for a National AI R&D Strategy Grounded in Trust, Testing, and Transparency

The University of Cincinnati recommends that the 2025 National AI R&D Strategic Plan prioritize the creation of a **federated national network of AI testing and validation hubs**, grounded in **verification, validation, and accreditation (VV&A)** and aligned with national priorities in **cybersecurity, healthcare, aerospace, and critical infrastructure**. UC's new 180k square foot Interdisciplinary Research Facility, Digital Futures, which houses the AI Bio Lab; the Ohio Cyber Range Institute (OCRI); the Center for Hardware & Embedded Systems, Security & Trust (CHEST); and the Hypersonics Lab; provides a **scalable model** for such a network.

Key Recommendations

1. Stand Up a National Network of AI Testing and Certification Hubs

- Build a coordinated network of **neutral, secure AI testbeds** across the U.S. to support regulatory sandboxes and system validation.
- Use existing high-performing centers—such as UC's OCRI in Digital Futures—as blueprints to guide hub development.
- Prioritize accessibility for **startups, small labs, and researchers**, enabling ethical validation at the speed of business and at scale.
- Simulate high-stakes, real-world environments to test AI systems in cybersecurity, healthcare, and defense scenarios.

2. Elevate Fuzzy Logic and Hybrid Explainable AI as National R&D Priorities

- Advance national investment in **explainable, resilient AI models**, such as fuzzy logic and hybrid systems.
- These models enable:
 - Transparent, human-like reasoning.
 - Partial functionality during degraded operations.
 - Real-time adaptability—critical for persistent cyber engagement and mission assurance.
- Ensure new models meet evolving standards for **trustworthiness, traceability, and operator accountability**.

3. Formalize Tri-Sector AI Collaboration for Public Infrastructure Protection

- Create a framework for **mission-driven AI consortia** that link academic research, industry expertise, and federal mission needs.
- Use models like Digital Futures, where high TRL and use-inspired, applied research, secure simulation, and agile prototyping address real-world infrastructure challenges (e.g., hospital cybersecurity, emergency response).

- Nationalize this approach to overcome gaps where private-sector incentives are insufficient to protect legacy systems.

4. Expand Workforce Training and Human-Machine Teaming

- Embed **AI-human teaming** into national workforce development strategies.
- Use digital twin environments and immersive platforms to teach responsible AI interaction, override, and trust-building.
- Scale regional training hubs tied to national AI certification programs—leveraging the model currently used by OCRI and UC partners.

Digital Futures at UC: A Model for National Replication

The University of Cincinnati's Digital Futures Interdisciplinary Research Facility and Program of Research provides an **integrated R&D platform** where AI, cybersecurity, and digital infrastructure converge. It:

- Hosts field-tested AI use cases (e.g., wildfire coordination, UAV control, cyberattack response).
- Integrates fuzzy logic systems for **real-time decision support** in contested and uncertain environments.
- Operates as the **anchor site for OCRI**, facilitating red/blue teaming, cyber defense simulations, and multi-institutional training.
- Demonstrates the value of **public-private-academic collaboration** in addressing high-stakes national priorities.
- Hosts state-of-art facilities for conducting restricted, and soon, classified, research.

This model shows how AI testing environments can be **localized, modular, and nationally aligned**, enabling a **scalable network of AI innovation hubs**.

Summary of Actionable Recommendations by Timeline

Short-Term

- Stand up pilot regulatory sandboxes at existing centers of excellence.
- Establish standardized VV&A protocols for AI models in critical systems.

Mid-Term

- Federate university-based testbeds into a national AI VV&A network.
- Scale to simulate national infrastructure systems using up to 1M-node environments.

Long-Term

- Use national hubs to support emergency management, healthcare resilience, and secure communications.
 - Build a pipeline of AI professionals trained in simulation-rich, operationally realistic environments.
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Conclusion

To secure America's future in artificial intelligence, we must build a **national ecosystem grounded in trust, transparency, and testability**. By creating a **federated network of AI hubs**—inspired by UC's Digital Futures and the successful research & workforce programs within it such as OCRI and CHEST (an NSF IUCRC)—we can accelerate ethical innovation, validate safety-critical systems, and train the workforce needed to integrate AI into daily life and national defense. This approach balances rapid advancement with responsible deployment, ensuring AI systems serve the public good while advancing U.S. strategic interests.

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