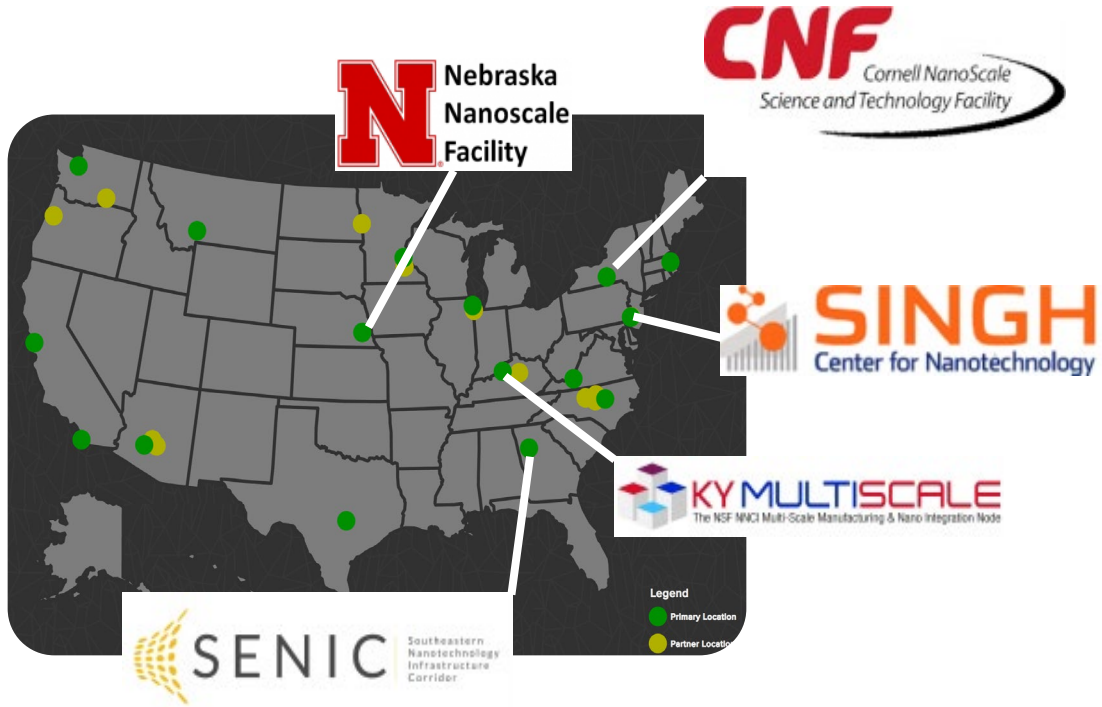
Nano-Enabled Internet-of-Things

The nano-IoT research community



Our working hypothesis

Many devices and IoT* applications will be enabled by nanotechnology

*IoT describes:
physical objects embedded with sensors and actuators that communicate with computing systems via wired or wireless networks.

What we do:

- We organize and participate in symposia
- Present research from participating sites
- Disseminate information and lessons learned
- Report at annual NNCI meetings

National Nanotechnology Coordinated Infrastructure

NSF

Nebraska Nanoscale Facility

Nano-Enabled Internet-of-Things: a brief history

A brief history of the nano-IoT research community:

1st NNCI Nano-Enabled Internet-of-Things Research Community Symposium September 29, 2021 (virtual) organized by Mark Allen et al. (Univ. of Pennsylvania)

2nd NNCI Nano-Enabled Internet-of-Things Research Community Symposium August 16, 2022 (hybrid) organized by Chris Ober et al. (CNF)

Our vision is that the ubiquitous sensing potential of the Nano-Enabled Internet of Things (Nano-IoT)* will:

- provide the input necessary for data mining/big data processing to understand complex system behavior
- augment the interaction environment in future workplaces
- be the transducers that can monitor living things from agriculture to medicine
- catalyze the convergence of researchers from many intellectual backgrounds

Impact of Autonomy on Transformative Transportation and Logistics
Kaydon Stanzione, Logistiwerx

Enabling IoNT: Internet of Things Infrastructure
Rick O'Brien, SemperCon

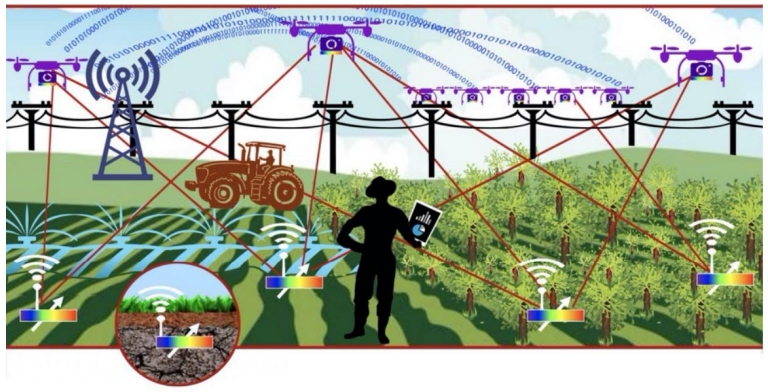
IoT4Ag
Cherie Kagan, University of Pennsylvania

Irrigate? Ask the tree!
Implantable MEMS to measure plant hydration
Michael Santiago, FloraPulse

Flexing, Bending and Stretching Toward Advances in Electronics for Medical and Industrial Applications
Mark Poliks, Center for Advanced Microelectronics Manufacturing, Binghamton University

Hybrid Electronics
Speaker Scott Miller, Ph.D., Director of Technology, NextFlex

Programmable Plants and the Internet of Living Things
Abraham D. Stroock, Gordon L. Dibble '50 Professor, Smith School



National Nanotechnology Coordinated Infrastructure

NSF

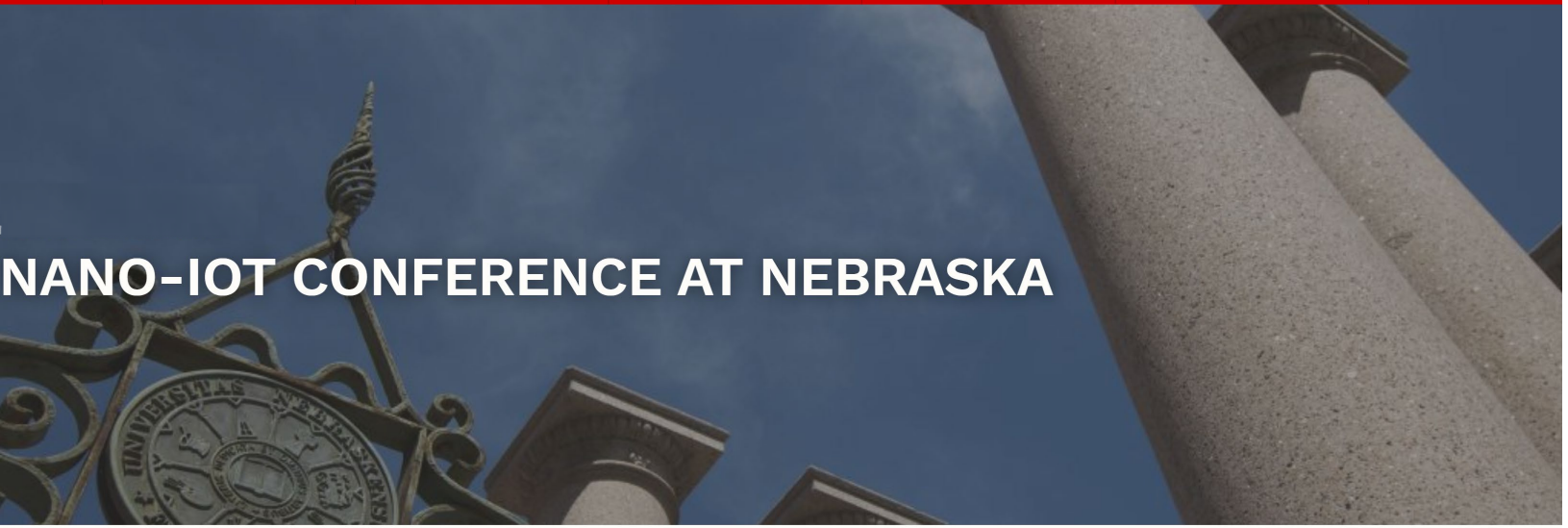
Nebraska Nanoscale Facility

Nano-IoT Research Community 2023

- **Building on "data mining/big data processing" the plan was to have a symposium on September 11, 2023 at the University of Nebraska-Lincoln**

NEBRASKA NANOSCALE FACILITY

Home | Facilities | Becoming a User | Education Outreach Activities | Research | News & Events



The 2023 Nano-IoT Research Community Workshop to be hosted by the Nebraska Nanoscale Facility (NNF) at the University of Nebraska-Lincoln on September 11 has been canceled. **The workshop is postponed to a later date TBD.** Information about the rescheduled workshop will be posted here as it becomes available.

National Nanotechnology Coordinated Infrastructure | NSF | Nebraska Nanoscale Facility

- **Conflict with Nanotechnology Infrastructure Leadership Summit (NILS)**

NATIONAL NANOTECHNOLOGY COORDINATION OFFICE

July 24, 2023

Christian Binek
Director
Nebraska Nanoscale Facility (NNF)
University of Nebraska-Lincoln
855 N 16th Street
Lincoln, NE 68588

Dear Dr. Christian Binek,

On behalf of the National Nanotechnology Initiative (NNI), I am excited to invite you to join the Nanotechnology Infrastructure Leaders Summit (NILS) at the White House's Eisenhower

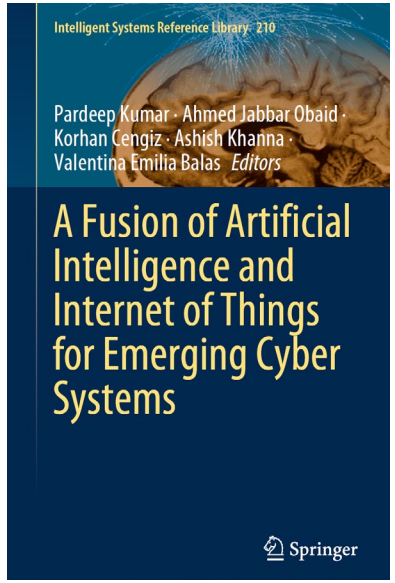
and subsequent

NNCI annual conference: October, 2023

Nano-IoT Symposium 2023: What was the plan?

- **An in-person workshop bridging AI and IoT known as AIoT with emphasis on hardware**

What is Artificial Intelligence of Things?



The International Data Corporation (IDC) estimates that there will be 41.6 billion IoT devices in 2025, capable of generating 79.4 zettabytes (ZB=10^{21} bytes) of data.

AI can convert IoT data into useful information

- **Selected secured speakers**

Dr. Fadi Alsaleem, Assoc. Prof.
Architectural Engineering
and Construction
University of Nebraska-Lincoln

Dr. Ian F. Akyildiz. Professor, Telecommunications.
Georgia Tech, President & CTO Truva Inc.

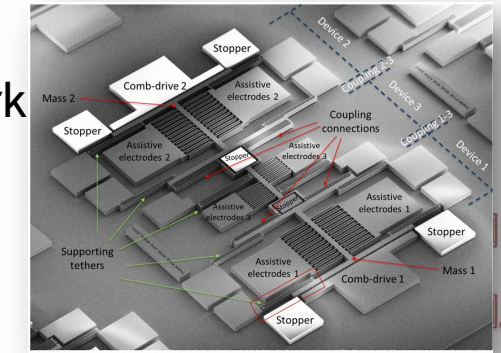
Software-Defined Reconfigurable Intelligent Surfaces

- Programmable wireless environments (PWEs) utilize internetworked intelligent metasurfaces to transform wireless propagation into a software-controlled resource

→ 6G wireless systems
AI-enabled metasurfaces

MEMS Neural Computer

- mechanical response of a network emulates a ML network



National Nanotechnology Coordinated Infrastructure

NSF

Nebraska Nanoscale Facility

What's next ?

1. **Reviving the canceled workshop in 2024 ?**

   ➡ to be discussed among members of the nano-IoT research community

2. **It is time to think about our legacy as research community**

   ➡ Writing a review article about what we learned as research community?

   Suggested by Mark Allan at the Nanotechnology Infrastructure Leadership Summit
   to be discussed among members of the nano-IoT research community

3. **Realizing 1 and 2**

   ➡ to be discussed among members of the nano-IoT research community

National Nanotechnology Coordinated Infrastructure

NSF

Nebraska Nanoscale Facility