





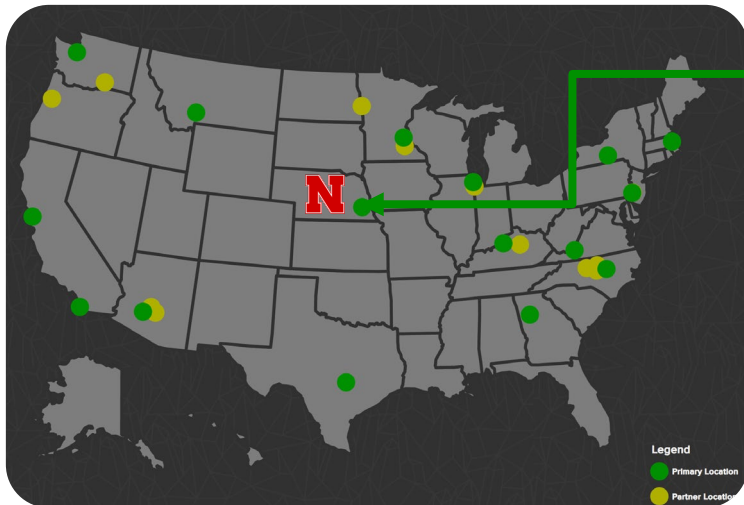


NEBRASKA NANOSCALE FACILITY: NNF

What successful examples of programs, activities, and relationships in the current NNCI could be adapted or expanded for multiple sites in a future network to increase impact?

Christian Binek *, Rebecca Lai ^δ, Jacob John [†], Steven Wignall [§],
Jenna Huttenmaier [§], Shelli Krupicka [‡]

*Director: NNF & NCMN, ^δAssociate Director: NNF, [†]Coordinator & Program Manager: NNF,
[§]E/O Program Associate: NNF, [‡]Administrative Coordinator: NNF & NCMN



NNF
NCMN



Voelte-Keegan Nanoscience Research Center
@ University of Nebraska

NNCI annual conference: October, 2023

Selected successful programs at NNF

● At NNF we believe that:

- * we have strong E/O activities
- * E/O activities are an important component of workforce development

Workshop on:

Quantum Computing, Information,

Science, & Engineering at NSF, Alexandria, VA, March 23–24, 2023

Steven Wignall at *QED-C task force meeting in Albuquerque, NM, August 16-18, 2023



*Quantum Economic Development Consortium Industry driven consortium with the mission to support a robust U.S. QIST industry



Nanotechnology Infrastructure Leaders Summit, September 2023

Workshop on: Quantum Computing, Information, Science, & Engineering at NSF, Alexandria, VA, March 23–24, 2023 (https://quantumcomputing.msstate.edu/wp-content/uploads/qCISE_report.pdf)



Christian Binek, NNF director

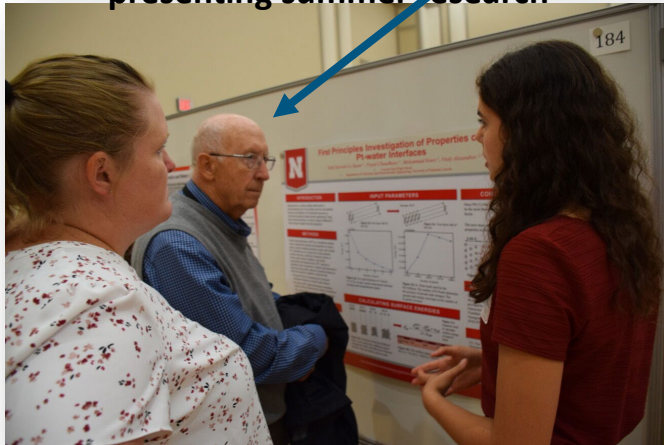
E/O and workforce development

● E/O can lead to interaction with partners from industry and workforce development

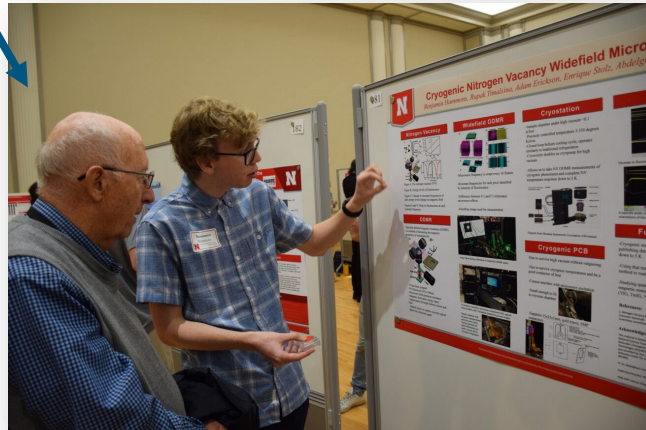


Prof. Woollam helps financing the REU program each summer through the NCMN-J.A. Woollam STEM Education fund

Summer High School Interns presenting summer research



Ben H. worked the past 2 summers in Prof. Laraoui's lab (Mech. & Materials Eng.)



High School Students and RET's touring the Woollam Ellipsometry Factory in Lincoln NE



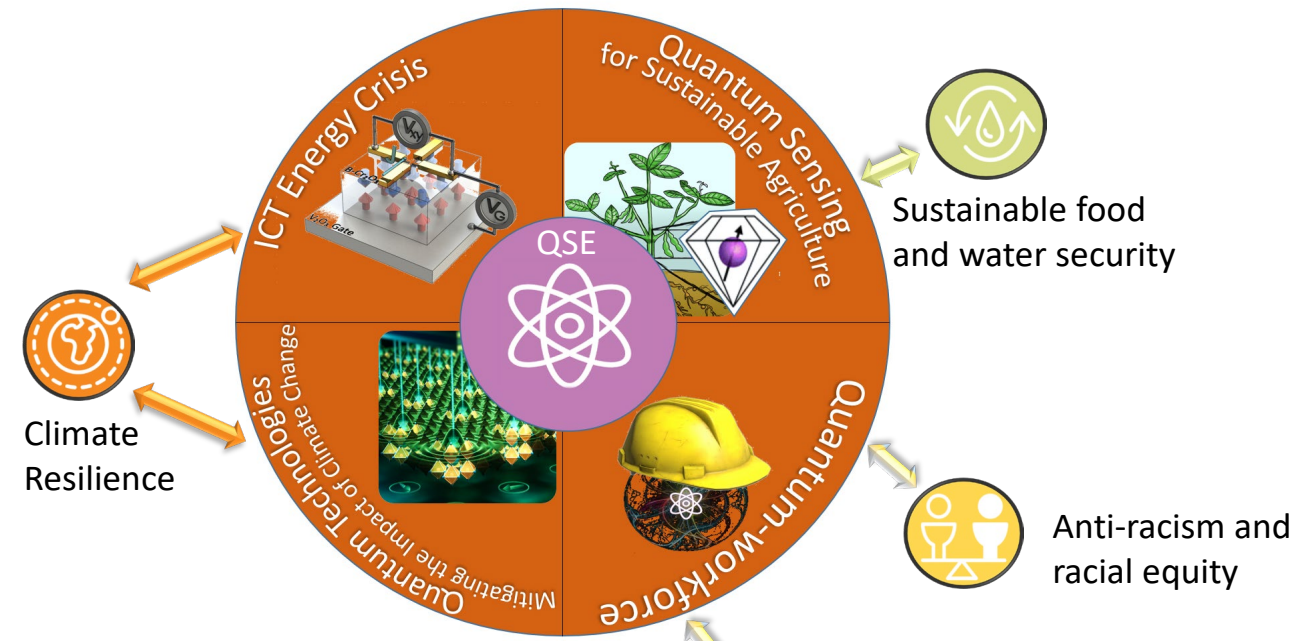
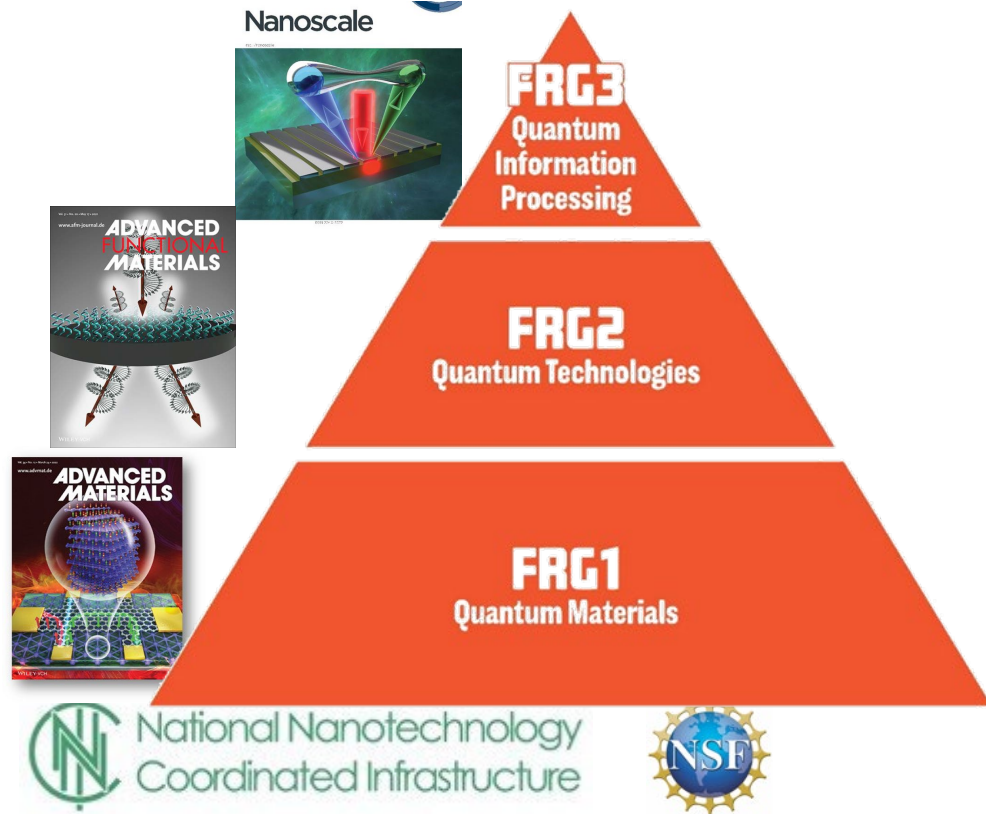
NNF's role in national research priorities


● NNF and the Quantum Leap Initiative

NNF infrastructure  \$20M NSF EPSCoR center Emergent Quantum Materials and Technologies
4 NE universities, two tribal colleges (2021-2026)

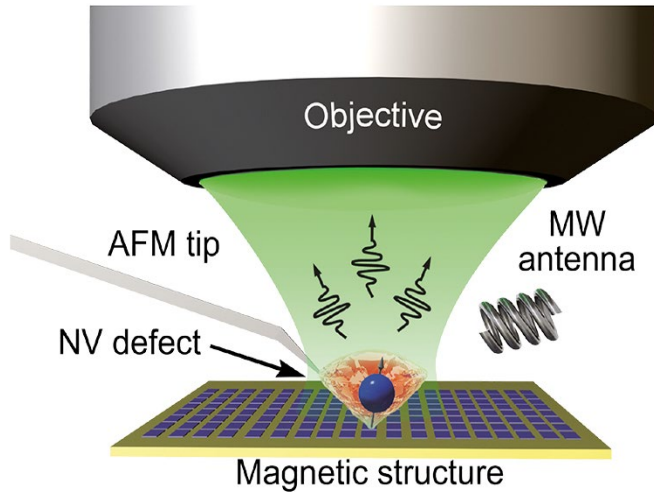


 \$4.17 M UNL internal grand challenges award
Quantum Approaches Addressing Global Threats (started October, 2023)



 Science & Technology literacy for society
NCCI annual conference: October, 2023

New tools for the quantum leap



Nitrogen Vacancy (NV) - Color Center based SPM ProteusQLT with closed cycle cryostat base temperature < 2K Supports Nanomagnetometry, Quantum Sensing and Quantum Communications research
Funded via NSF MRI grant+ NCMN funding + UNL support

NNF houses Physical Property Measurement System DynaCool 9Tesla cryo-free

With:

- electric transport**
- horizontal sample rotator**
- vibrating sample magnetometer**
- He-3 refrigerator (0.5K continuous, 0.35K single shot)**



Vision for the future

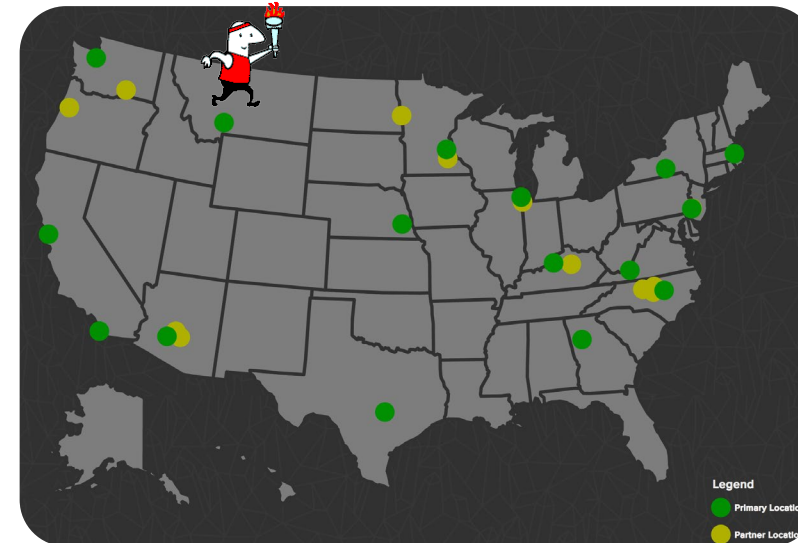
- Use E/O as an effective instrument for workforce development

Note NNCI REU convocation 2024 at Nebraska tentatively August 4-8, 2024



Jenna Huttenmaier

Steven Wignall



- Leverage NNF/NCMN infrastructure to establish and support a diverse quantum research community at UNL and beyond.
- Leverage NNF/NCMN infrastructure to become part of workforce development efforts enabled by the CHIPS and Science act.