



Steven Koester
MiNIC (U Minnesota)



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Concept:

Enabling quantum information, science, and technology via network-wide nanofabrication infrastructure and expertise.

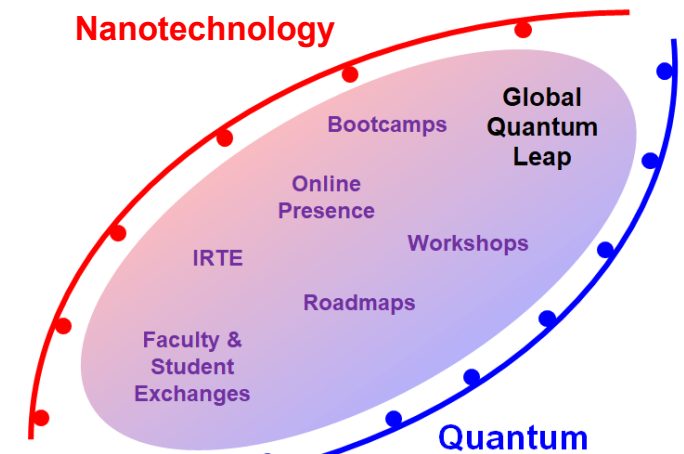
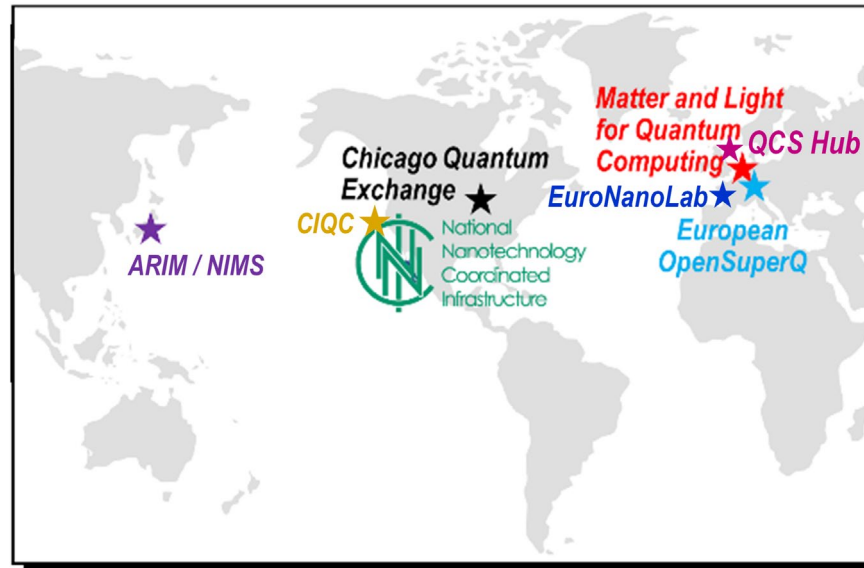
Approach:

Rethink current methods to develop **quantum-specific** best practices:

- Materials processing & characterization to promote quantum performance
- Materials interface preparation, treatment and characterization
- Systems integration of quantum devices
- Packaging technologies
- Contribute to the development of a **quantum-ready workforce**.

- Many activities have been through the Global Quantum Leap (GQL) AccelNet program, led by the University of Minnesota (more details will be provided in the MiNIC node update):
- Three main activities ongoing / planned:
 - Student / faculty exchanges coordinated and funded through the GQL,
 - Quantum Technology Infrastructure Roadmap (QTIR) preliminary organization,
 - Support for several workshops and short courses.

- The Global Quantum Leap (GQL), a strategic alliance between the NNCI and international networks on quantum information sciences. Funded through the NSF AccelNet program.
- GQL creates an international “network-of-networks” at the intersection of nanotechnology and quantum information sciences. 8 networks spanning 4 continents.
- The GQL does not directly fund research, but instead funds activities to enhance network connections such as student/faculty exchanges, bootcamps and workshops.



<https://www.globalquantumleap.org/>

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- Quantum Technology Infrastructure Roadmap (QTIR):

Leads: Vlad Pribiag (UMinn), Chris Ober (Cornell), Steven Koester (UMinn)

- Initial coordination meetings held April 2022
- Range of quantum platforms (superconducting; topological; trapped ions; spins; color centers)
- Researchers from each topical area
- Result: Refocus target audience (fabrication facilities and funding supporting these) and scope (fabrication and assembly/integration for early & mid-stage quantum platforms)

Goals:

- Version 1 roadmap by 2023, Version 2 roadmap by 2025
- Publish in archival journal (e.g. npj Quantum Information, PRX Quantum)

SC	Heike Riel	IBM
SC	Jonas Bylander	Chalmers
Trapped ion	Patty Lee	Honeywell
Spin	Ruoyu Li	IMEC
SC	Mark Nelson	Skywater
Color Center	Shangying Cui	HRL
Topo	Sergey Frolov	U Pittsburgh
Topo	Chris Palmstrom	UCSB
Topo	Srijit Goswami	QuTech (Delft)
NV	Greg Fuchs	Cornell
NV/SC	Nathalie de Leon	Princeton
SC	Rob Schoelkopf	Yale

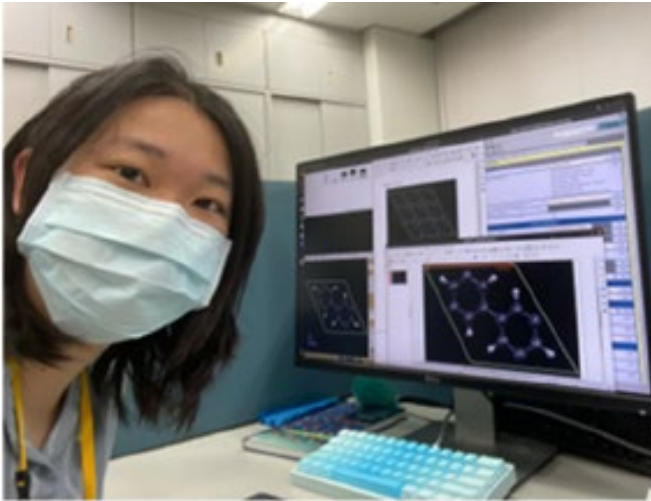
Summer 2022, International Research and Training Experience (IRTE): NIMS, Tsukuba Japan

- 2 students, 1 postdoc participant.
- Very good feedback despite concerns about COVID.

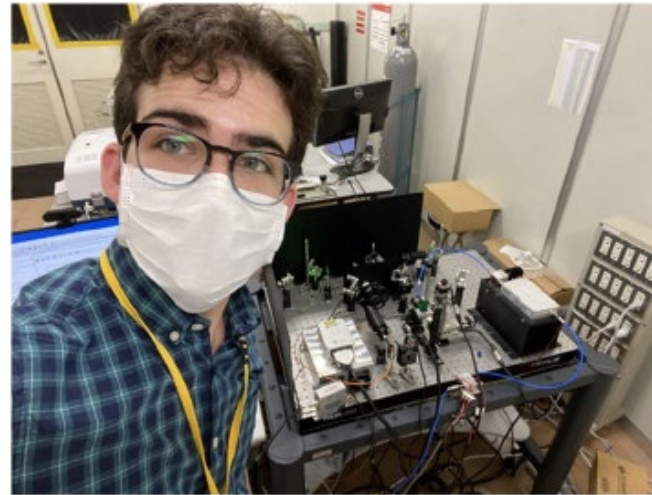
“Great opportunity to collaborate & work with researchers worldwide.”

“Scientifically and socially transformative.”

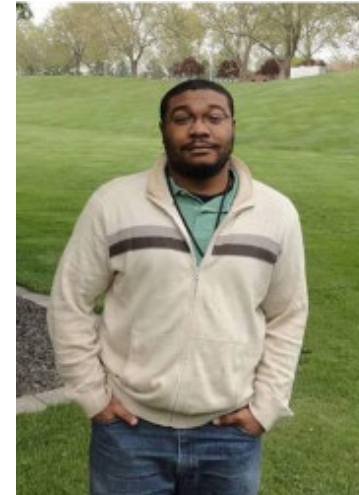
“Best experience one could have.”



Veronica Show
Harvey Mudd



Aulden Jones
Georgia Tech



Zizwe Chase
University of Illinois - Chicago



Summer 2022, Research-Specific Graduate Student / Postdoc Exchange Program

- Student exchange: U Minnesota to Julich Research Center, Julich Germany
- Student exchange: Oxford University to University of Oregon
- Student exchange: UC Berkeley to University of Tokyo
- Postdoc exchange: Delft University to Cornell



Justus Teller
U Minnesota → Julich



Isabel Sacksteder
Berkeley → Tokyo



Ellis Ainley
Oxford → Oregon

New opportunities:

- Two 2023 International Research and Training Experience (IRTE) opportunities open to students at US universities:
 - 10-week summer program in quantum materials: NIMS @ Tsukuba, Japan (3 students).
 - 10-12 week summer program in quantum information at RWTH Aachen University in Aachen, Germany (4 students).
 - Applications due by November 18, 2023. Applications can be requested by emailing Lynn Rathbun at LCR2@cornell.edu.



10/9/22

Applications Open

Summer 2023 International Research and Training Experience (IRTE) on Quantum Materials and Devices in Japan and Germany

[Read More](#)

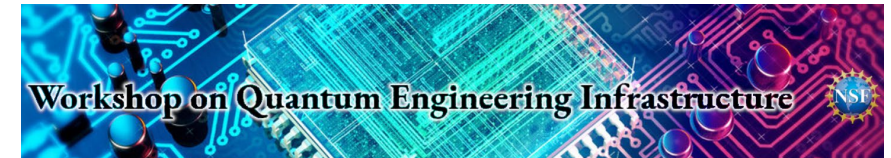
See announcement and application link for full details:

<https://www.globalquantumleap.org/announcements/irte-applications-open-summer-2023>

Planning for future workshops / bootcamps:

- **Quantum Nanofabrication Workshop:** Co-sponsoring NSF-sponsored workshop “Building a Nanofabrication Facility for Quantum Science and Engineering” (CU Boulder). Travel support for international participants & advertising. <https://www.colorado.edu/ecee/quantum-nanofabrication-workshop>
- **Workshop on Quantum Engineering Infrastructure II:** Follow-up to 2021 event will help to drive road-mapping activities. Tentatively planned for Spring 2023.

https://nci.net/sites/default/files/inline-files/WQEI_final_report_final.pdf



- **Winter School on Quantum Technology:** Prof. Tony Low (Minnesota): Quantum effects & technology school. In collaboration with Kyung Hee University (South Korea)
 - Bootcamp focus on fundamentals of quantum phenomena
 - Fabricating functional quantum devices
 - First cohort with students from Kyung Hee University
 - Expand to be open to the broader community in summer 2023



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If anyone has suggestions for additional quantum-related interactions within the NNCI community, feel free to reach out to us at:

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