

PROFICIENT SKILLS

Hardware [Expert in Bold]

Dilution refrigerator: Bluefors XLDsl • μ -w packaging.

Optical & electron-beam lithography: **Karl Suss-MA6** • Heidelberg DWL200 • **Raith EBPg-5000+** (100 kV).

Deposition & plasma etching: **sputtering** • **e-beam evap** • Ion Probe • **PECVD** • ALD • RIE • **IBE**.

Imaging: SEM • AFM • surface 2D/ 3D profilometry.

Machining & 3D printing: metal mill • lathe • **FDM** • IR LASER cutting (150W) • stereolithography (SLA).

Software [Expert in Bold]

MS Office • AutoCAD • **Fusion 360** • **KLayout** • Qiskit • **Qiskit Metal** • **Blender** • Git • Julia • LaTeX • **MuMax3** • Python+GPT-4 • **Elmer FEM** • RealVNC + Linux.

Problem Solving & Communication

Ethical leadership • **optimism** • project management • scientific computing • **idea generation** • engineering design process • **rapid prototyping**.

EDUCATION

DOCTOR OF PHILOSOPHY – (Ph.D.), ELECTRICAL ENGINEERING,

[Quantum Hardware/ Spintronics Focused]

University of Minnesota-Twin Cities (Minneapolis, MN)

06/2022 – 04/2027 [In Progress]

BACHELOR OF SCIENCE – (B.S.Md.S.), MULTIDISCIPLINARY STUDIES,

University of Minnesota-Twin Cities (Minneapolis, MN)

08/2018 – 11/2021

RELATED CERTIFICATIONS

Full list: z.umn.edu/OJB-Certifications

IBM CERTIFIED QUANTUM DEVELOPER – [PROFESSIONAL]

International Business Machines Corporation (IBM)

02/2022

ASSOCIATIONS

2024 Quantum Collaborative Steering Committee

2023 Minneapolis Quantum Association – Member

2022 QuantumGrad – Mentor/ Lecturer

2022 IBM Quantum Researchers Program Member/ Group Administrator (ibm-q-research-2)

2021 IEEE Quantum & IEEE UMN (Tech Sub-Comm)

2016 American Indian Science & Engineering Society (AISES) Chapter V.P. at Utah State

PUBLICATIONS

Google Scholar (z.umn.edu/OJB-Google-Scholar)

ORCID (orcid.org/0000-0002-8391-9105)

GitHub (github.com/OJB-Quantum)

QuantumGrad (z.umn.edu/OJB-QC-Hardware)

EXPERIENCE

International Business Machines Corporation (IBM)

Quantum Hardware Engineer – PhD Intern,

Quantum Hardware Design & Simulation, Kevin Tien Group, IBM Thomas J. Watson Research Center

05/2024 – 08/2024 | Yorktown Heights, NY >

• Realized the high-throughput **automated cryogenic characterization** of **quantum-limited amplifier materials** to support the **bandwidth** for IBM's quantum-centric supercomputing systems.

• Generated extensive internal documentation for configuring dilution fridges with high-security IBM server. (Made possible with an interdisciplinary team).

• Disassembled, reassembled, & utilized a 10 mK **Bluefors XLDsl dilution fridge** for experiments in the quantum characterization lab.

University of Minnesota-Twin Cities

Graduate Research Assistant,

Nano Magnetism & Quantum Spintronics Lab, Jian-Ping Wang Group, Electrical & Computer Engineering Dept.

08/2022 – Present | Minneapolis, MN >

• Recognized as a resident nanopatterning expert on robust, integrated/ dedicated metal spintronic devices. (**8 years of fast-paced cleanroom experience**).

• **Formed/ led/ trained a new quantum hardware engineering team** to develop a quantum processor & cryogenic classical memory array. (Fractal design, **magnetic, spin qubits & superconducting** magnetic tunnel junctions [**nano MTJs**]). Device sizes (20 nm - 5 μ m).

• Advocated for quantum hardware training. Created **GitHub tutorials** demonstrating **e-beam lithography** processes with qubit pattern generation in **Qiskit Metal**.

Research Assistant,

Nano Magnetism & Quantum Spintronics Lab, Jian-Ping Wang Group, Electrical & Computer Engineering Dept.

02/2020 – 08/2022 | Minneapolis, MN >

• Successfully **trained/ mentored** 11 new academic users (PhD-level) & 1 faculty on **high-yield** quantum device fabrication & electron microscopy in the cleanroom.

• Developed recipes & protocols for patterning high-yield Perpendicular **Magnetic Tunnel Junctions** (p-MTJs) used in spin-orbit torque magnetic random-access memory (**SOT-MRAM**), computational random-access memory (**CRAM**), & **magnetic brain interface chips**. Device sizes (100 nm – 6 μ m).

• Co-authored several peer-reviewed publications on energy-efficient spintronic devices composed of **engineered metal thin films**.

RECENT ACTIVITIES

Navaho Linguistics for Quantum Hardware | 2024

University of Minnesota (Minneapolis, MN)

AWARDS & RECOGNITION

2024 **IBM Media Recognition** (*Life @ IBM*, Global)

2024 **National Science Foundation Graduate Research Fellowship** [Prestigious]

2023 Global Quantum Scholarship – (Womanium Quantum)

2022 Departmental Fellowship/ Assistantship – (UMN ECE Dept.)

2021 **Raith GmbH Media Recognition** (World Leading Nanofabrication Instrumentation Manufacturer)

2021 **REC Foundation Media Recognition** – Native American Profiles in STEM

2021 Thank-a-Teacher Award, (UMN Center For Educational Innovation)

2021 Dean's List

2020 IBM Quantum Full Sponsorship – (Qubit by Qubit)

2019 **Front Cover of National Magazine** (*Winds of Change*, USA)

2018 **University Magazine Story Feature** (*Discovery*, USA)

2017 & 2018 National Science Foundation – Materials Research Science & Engineering Centers (MRSEC) Fellowship – REU [Highly Competitive]

2016 Native American STEM Mentorship Award

2014 Presidential Scholar Award - Full Scholarship [Highest University Award]

2014-to-2017 Chief Manuelito Scholar Award – Navajo Tribe [Highest Tribal Award]