NAISE CMOS+X Workshop

Bridging CMOS Manufacturing with Neuromorphic & Quantum Technologies

Information Booklet

January 16, 2026

VENUE
Northwestern, Evanston Campus
NAISE HQ, Hogan Building, Suite 1-160
2205 Tech Drive, Evanston, IL, 60608
https://maps.northwestern.edu/facility/88

PARKING
Northwestern North Parking Garage*
2311 N. campus Drive, Evanston, IL, 60208
https://maps.northwestern.edu/facility/646
**once at event, please ask for a validation ticket*

NAISE CONTACTS

Technical:
Begum Gulsoy – Director of Research
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Logistics:
Iustitia Ko – Program Assistant
iustitia.ko@northwestern.edu

BRIEF

NAISE CMOS + "X" Workshop

Bridging CMOS Manufacturing with Neuromorphic & Quantum Technologies

January 16, 2026 @ NAISE / Northwestern – Evanston Campus

SCOPE

The NAISE CMOS + "X" workshop aims to foster collaboration between Northwestern University and Argonne National Laboratory by uniting experts in materials science, device engineering, neuromorphic architectures, and quantum science. A central theme is leveraging the extraordinary capabilities of advanced semiconductor manufacturing, where modern CMOS integrated circuits represent the most complex systems ever engineered, integrating billions of components at high yield and high volume. Against this backdrop, the workshop will explore CMOS + "X" heterogeneous integration: combining mature industrial processes with emergent materials, devices, and physical computing modalities to unlock new functionality for neuromorphic and quantum systems. A key objective is to form strong, competitive proposal teams for upcoming funding opportunities spanning fundamental research and applied microelectronics programs. Discussions will emphasize co-design across materials, devices, and architectures, as well as strategies for scaling prototype neuromorphic and quantum subsystems into larger, manufacturable systems. By aligning institutional strengths with national priorities and emerging scientific challenges, the workshop aims to catalyze innovative partnerships that advance next-generation neuromorphic and quantum technologies.

Subtopic #1: CMOS for quantum

- **Keynote**: Alberto Gómez (Lead IC designer at Quantum Motion)
- Prem Kumar (NU/ECE) - Electronic–photonic for QIS
- Enectali Figueroa-Feliciano (NU Physics): CMOS-compatible Josephson junctions
- Antonino Miceli (ANL/APS): CMOS for sensing and power delivery

Subtopic #2: Neuromorphic for compute and sensing (CMOS + emerging materials)

- **Keynote**: Jeff Shainline (Founder and CEO at Great Sky AI)
  - *Artificial Minds Made from Superconductors and Light*
- Vinod Sangwan (NU/MSE) - Neuromorphic nanoelectronic materials
- Jie Gu (NU/ECE) - Analog mixed signal compute solutions
- Adarsha Balaji (ANL/MCS) - Computing architectures

FINAL AGENDA

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All Times CST

08:40AM – 09:00AM Breakfast & Registration

09:00AM – 09:05AM **NAISE Welcome**
Begum Gulsoy, *Northwestern*

09:05AM – 09:15AM **Workshop Charge**
Nino Miceli, *Argonne*

Session I: Quantum Computing & Sensing

09:15AM – 09:45AM **Industry Keynote # 1: Alberto Gómez,** *Quantum Motion* **(Virtual)**
09:45AM – 10:00AM **Prem Kumar**, *Northwestern*
10:00AM – 10:15AM **Enectali Figueroa-Feliciano**, *Northwestern*
10:15AM – 10:30AM **Nino Miceli**, *Argonne*

10:30AM – 11:00AM Group Photo & *Break*

Session II: Neuromorphic Computing & Sensing

11:00AM – 11:30PM **Industry Keynote #2: Jeff Shainline,** *Great Sky AI* **(Virtual)**
11:30AM – 11:45PM **Vinod Sangwan,** *Northwestern*
11:45AM – 12:00PM **Adarsha Balaji**, *Argonne*
12:00AM – 12:15PM **Jie Gu,** *Northwestern*

12:15PM – 01:05PM Lunch

01:05PM – 01:10PM Breakout Charge

01:05PM – 01:55PM **Breakout Sessions I / Applications, Gaps & Limitation**

Breakout I-I: Big Ideas for Applied Science
Discussion Lead: **Tejas Guruswamy**, *Argonne*

What are some of the big ideas we can go after as a community in partnership with industry? How can an NU-Argonne partnership provide a unique "testbed" or prototyping environment that big industry is not currently offering startups?

Breakout I-II: Gaps and Limitations for Scale Up
Discussion Lead: **Laura Schulz,** *Argonne*

What are the gaps and limitations stopping us from scaling up applied research? Identify how architectures must change to accommodate new materials, and how materials must be adapted to survive CMOS back-end-of-line (BEOL) processing. Yield vs. Novelty: What are the primary "yield killers" when moving from a single-device lab prototype to an integrated CMOS wafer?

Breakout I-III: Next Generation Fundamental Science
Discussion Leads: **David Barton and James Rondinelli**, *Northwestern*

Where do we need to expand our fundamental knowledge in order to enable the co-design of next generation applications? Do we have the simulation tools to model a hybrid system across scales—from quantum mechanical effects in the material to circuit-level timing in the CMOS?

01:55PM – 02:05PM Transition time

02:05 PM – 02:55PM **Breakout Sessions II / Funding Opportunities**
What are the current or potential funding opportunities and partners? What preliminary data or experiments are we currently missing, that would we make a major proposal compelling?

Breakout II-I: Industrial & Applied Research Funding for Quantum
Discussion Lead: **Enectali Figueroa-Feliciano**, *Northwestern*

Breakout II-II: Industrial & Applied Research Funding for Microelectronics
Discussion Lead: **Jie Gu**, *Northwestern*

Breakout II-III: Fundamental Research Funding for Quantum
Discussion Lead: **Jessica Jones**, *Argonne*

Breakout II-IV: Fundamental Research Funding for Microelectronics
Discussion Lead: **Jessica McChesney**, *Argonne*

02:55PM – 03:05PM Restructuring Notes & Break

03:05PM – 03:35PM Breakout Report Outs

03:35PM – 03:45PM Wrap up / Action Items / Reflections

03:45PM *Adjourn*

SPEAKERS AND BREAKOUT LEADS

Antonino Micelli | Argonne & Northwestern - NAISE Fellow
Workshop Lead Organizer
Group Leader, Detectors Group
X-Ray Sciences Division, Advanced Photon Source

Link to bio / interests

Alberto Gomez | Quantum Motion
Principal IC Engineer

Quantum Motion Website

Prem Kumar | Northwestern
Professor, Electrical and Computer Engnieering

Link to bio / interests

Enectali Figueroa-Feliciano | Northwestern
Associate Vice President of Research - National Laboratories
Professor, Department of Physics and Astronomy

Link to bio / interests

Jeff Shainline | Great Sky AI
Founder and CEO, Great Sky

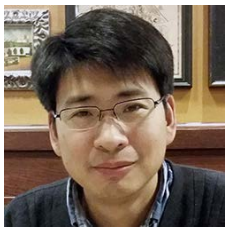
Great Sky Website

Vinod Sangwan | Northwestern
Research Associate Professor, Department of Materials Science and Engineering

Link to bio / interests

Adarsha Balaji | Argonne
Assistant Computer Scientist
Mathematics and Computer Science Division

Link to bio / interests



Jie Gu | Northwestern
Associate Professor, Department of Electrical and Computer Engineering

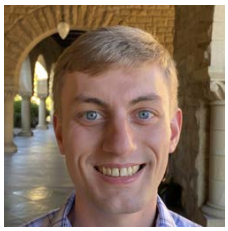
Link to bio / interests

Tejas Guruswamy | Argonne
Physicist
X-Ray Sciences Division, Advanced Photon Source

Link to bio / interests

Laura Schulz | Argonne
Project Lead for Innovation
Argonne Leadership Computing Facility

Link to bio / interests



David Barton | Northwestern
Assistant Professor, Department of Materials Science and Engineering

Link to bio / interests

James Rondinelli | Northwestern & Argonne – NAISE Fellow
Associate Professor, Department of Materials Science and Engineering

Link to bio / interests

Jessica Jones | Argonne
Argonne Scholar – Walter Massey Fellow
Applied Materials Division

Link to bio / interests

Jessica McChesney | Argonne
Physicist
X-Ray Sciences Division, Advanced Photon Source

Link to bio / interests

Begum Gulsoy | Northwestern & Argonne - NAISE Fellow
Workshop Co-organizer
Director of Research, NAISE
Director of Research, Office for National Laboratories
Research Associate Professor, Department of Materials Science and Engineering

NAISE Website
Link to bio / interests
