



CHICAGO QUANTUM EXCHANGE

IMPACT REPORT 2026

Boosting regional innovation capacity

The Bloch Tech Hub helps bring Bluefors Lab Service to Chicago

Shaping national workforce strategy

Quantum education and policy effort creates momentum across 27 states

Translating rules into advantage

CQE launches Quantum Law Navigator to drive sector growth



The Chicago Quantum Exchange (CQE) is an intellectual hub in Illinois, Wisconsin, and Indiana that advances the science and engineering of quantum information, trains the future quantum workforce, and drives the quantum economy by connecting leading universities, national labs, and industry partners. The CQE community is home to some of the world's top experts in the field and is a central driver of US leadership in quantum technologies.

OUR WORK



Advancing Research,
Discovery, and Impact



Powering the
Quantum Prairie



Training Quantum
Professionals



Driving the
Quantum Economy

OUR MEMBERS



ON THE COVER: IBM's Hanhee Paik at the opening of a public display model of an IBM Quantum System One quantum computer that was installed in United's Terminal 1 at O'Hare International Airport in September by the Scientists, Technologists, and Artists Generating Exploration Center at the University of Chicago Pritzker School of Molecular Engineering and IBM.

MESSAGE FROM THE CQE LEADERSHIP

The International Year of Quantum Science and Technology was a year of impact for the CQE community. The Illinois-Wisconsin-Indiana region emerged as a globally competitive quantum ecosystem — the culmination of years of federal research investment, strategic cooperation throughout the CQE community, and significant state and corporate support. The Quantum Prairie now drives progress along the entire discovery-to-deployment pipeline and is helping transform America’s growing quantum economy into a powerhouse primed to deliver advances in medicine, information security, and more.

You will see evidence of this influence throughout this report, from the \$21 million gift that will establish the Berggren Center for Quantum Biology and Medicine at the University of Chicago to the plan for quantum-enabled information security that propelled the CQE-led Quantum Connected team to the final stage of the National Science Foundation Regional Innovation Engines competition. In 2025, UChicago and the CQE forged landmark partnerships with IonQ to advance quantum computing and networking, and leaders broke ground at the Illinois Quantum and Microelectronics Park and announced that it will house Pasqal’s US headquarters and Infleqtion’s global quantum computing headquarters. The EDA-designated Bloch Quantum Tech Hub helped bring Bluefors Lab Service to the US for the first time — and it advanced to the final stage of the Tech Hubs funding competition with a proposal to build a quantum manufacturing supply chain and accelerate manufacturing commercialization.

The CQE, now at nearly 70 partners, is at the forefront as the sector prepares for at-scale deployment. In this Impact Report, you will read about our initiative to map the quantum-law landscape, efforts to align skills development with employer needs, and the integration of potential end users into R&D and translation efforts — all parts of building a full-spectrum quantum ecosystem.

We hope you will join us in celebrating our shared progress as we continue to leverage Midwest power to help fuel US quantum growth.

DAVID AWSCHALOM

Liew Family Professor of Molecular Engineering, University of Chicago; Director, Chicago Quantum Exchange; Senior Scientist, Argonne National Laboratory

BONNIE FLEMING

Chief Research Officer and Deputy Director of Science and Technology, Fermi National Accelerator Laboratory; Professor of Physics, University of Chicago

SUPRATIK GUHA

Senior Scientist / Senior Advisor to Physical Sciences and Engineering, Argonne National Laboratory; Professor of Molecular Engineering, University of Chicago

PAUL KWIAT

Professor of Physics, The Grainger College of Engineering, University of Illinois Urbana-Champaign

KATE WAIMEY TIMMERMAN

Chief Executive Officer, Chicago Quantum Exchange

CQE PARTNERS 2025

Corporate Partners

Core partners identified with *
Partners added in 2025 identified with +

+Ability Engineering Technology
+Allstate
Ally
Applied Materials
Atom Computing
+Belden
*Boeing
Cisco
Corning
+Dirac Labs
Discover
D-Wave
EeroQ
Great Lakes Crystal Technologies
HRL Laboratories
*IBM
Infleqtion
*+IonQ
KPMG
Lake Shore Cryotronics
memQ
Microsoft
+NuCrypt
+Photon Queue
Proviti
PsiQuantum
qBraid
QNu
Qolab
QuantCAD
Quantinuum
Quantopticon
Quantum Corridor
Quantum Design
Quantum Machines
Quantum Opus
QuEra Computing
Rigetti
SandboxAQ
Seagate
Sivananthan Labs
+staC12
TOPTICA Photonics
Toshiba
+Unisys
WD Advanced Materials
Xanadu
Zurich Instruments

Nonprofit Partners

+Illinois EDC
Le Lab Quantique
P33
QED-C

International Partners

CQC2T
Indian Institute of Technology (IIT) Bombay
QuTech
Technion – Israel Institute of Technology
Weizmann Institute of Science

Regional Partner

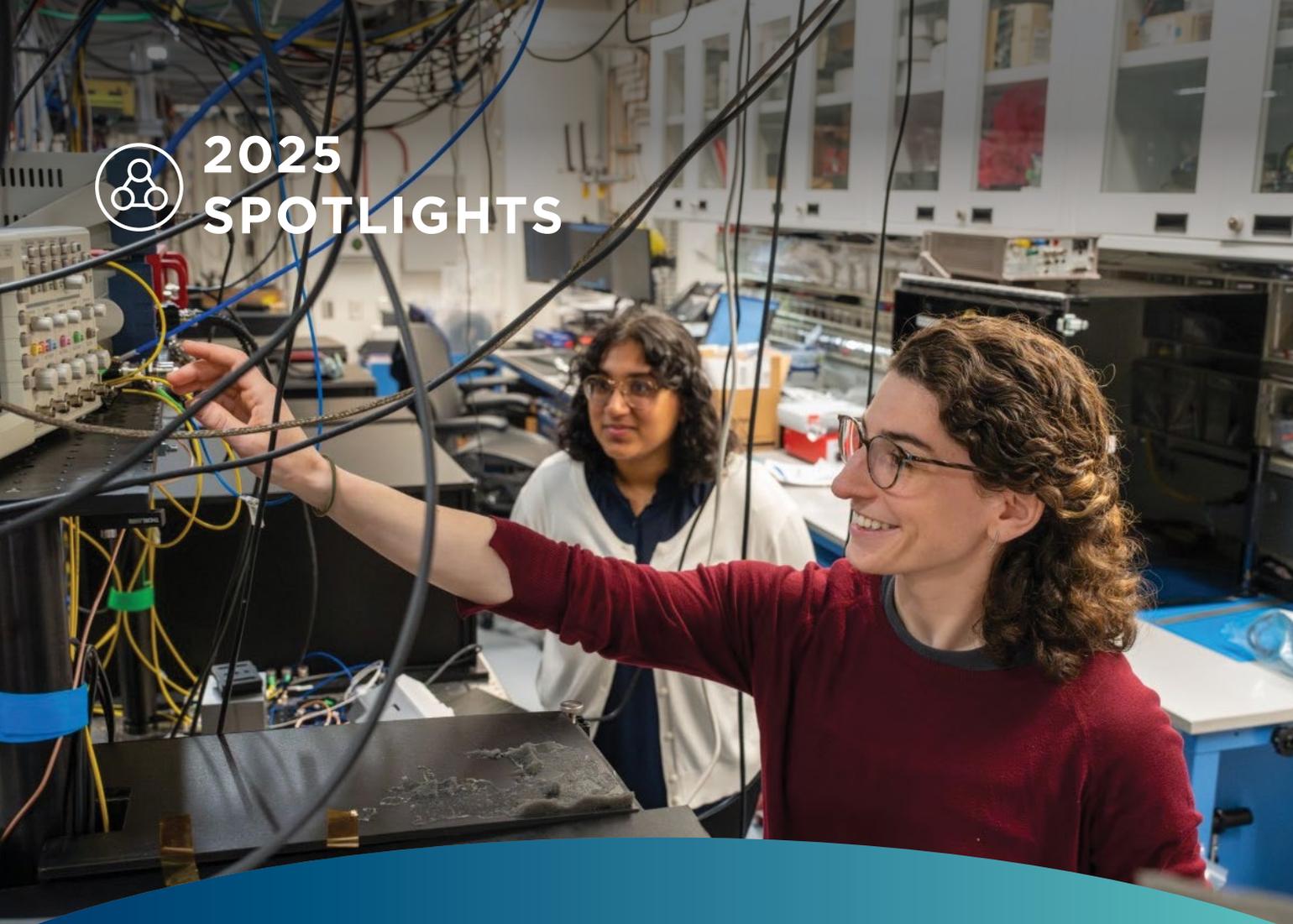
The Ohio State University

Duality/Alchemist Chicago Startups

+Florence Quantum Labs
+K1 Semiconductor
+QodeX Quantum
+Qoro Quantum
+Quantum Research Sciences
+quasi ai
+SQK Inc.



2025 SPOTLIGHTS



UChicago, CQE partner with IonQ in landmark initiative to advance quantum research

A CQE core partner, IonQ contributes to quantum network expansion with potential to drive development of quantum-based security

ABOVE: Graduate student Swathi Chandrika (left) and postdoctoral scholar Leah Weiss (front right) are part of the University of Chicago Pritzker School of Molecular Engineering (UChicago PME) Awaschalom Lab group, which focuses on spintronics, solid-state, and molecular quantum information science for computing, sensing, and communication. (Image by Jason Smith, courtesy of UChicago PME)

The University of Chicago is partnering with global quantum company IonQ on an initiative that will advance research and discovery in quantum science and engineering, helping develop technologies with the potential to improve lives — from quantum computers and ultra-secure quantum communication networks to industry-defining quantum applications and quantum sensors.

IonQ also joined the CQE as a core partner, alongside Boeing and IBM. As part of the arrangement, the CQE will expand the fiber quantum testbed that connects UChicago, the CQE, and Argonne National Laboratory and

Fermi National Accelerator Laboratory in Chicago's western suburbs — which at 124 miles is already one of the nation's longest quantum networks. Applications of utility-scale quantum networks include unbreakable encryption, distributed quantum computing, and ultra-precise, connected quantum sensing.

The work will contribute to the Midwest's growing strength in quantum, which has benefited from millions of dollars in support from the state of Illinois. The state's investment in quantum science and technology includes a commitment to support new space on UChicago's campus for UChicago and the University of Illinois Urbana-Champaign in collaboration with the CQE. Housed in the forthcoming IonQ Center for Engineering and Science, the CQE offices and collaborative lab spaces will provide expanded support for the work of the CQE's nearly 70 corporate, nonprofit, and international partners.

The initiative also could seed more than 140 research and

technology development projects based at UChicago and extend them to national laboratories, other universities, and industry partners. The installation of IonQ's production-grade trapped ion quantum technology could pave the way toward novel uses of quantum simulators and computers, ranging from the simulation of new quantum materials with entangled atomic states to calculating the reaction rates for large molecules — computations that are difficult to impossible today through classical techniques. Connecting quantum computers to quantum networks could create an interconnected quantum ecosystem and powerful new research tools, with potential benefits to human health, energy technologies, and the environment.

IonQ is also a part of the US Economic Development Administration–designated Bloch Quantum Tech Hub, a CQE-led coalition leveraging the Midwest's deep scientific and manufacturing assets to drive US leadership in quantum technologies.

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“The global quantum effort works when we align strengths. Australia brings deep expertise in theory, materials, devices, and sensing; Chicago and the broader US network bring scale, testbeds, and supply-chain depth. The CQE shows how to stitch these pieces together.”

CATHY FOLEY, the former chief scientist of Australia

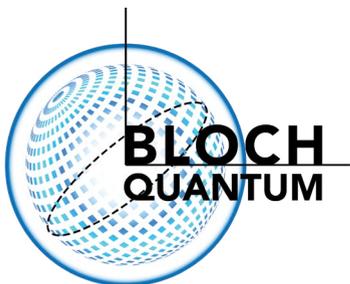


Why quantum computing ‘competition’ is a Quantum Prairie strength

Companies associated with the CQE region are developing at least seven different types of quantum computers, each with their own advantages and timelines. Ultimately, entangled quantum networks may integrate these different technologies, creating hybrid machines with extraordinary capabilities.

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**QUANTUM
CONNECTED**



CQE-led coalitions reach finals in NSF Engines, EDA Tech Hubs competitions

Two cross-sector, CQE-led teams driving integrated ecosystem development advanced in separate federal grant competitions.

Quantum Connected, which has contributed key economic projections and strengthened Midwest partnerships, reached the finals in the National Science Foundation Regional Innovation Engines competition with a plan to deliver quantum-based security for the nation. The Bloch Quantum Tech Hub, which helped expand the region's innovation capacity, advanced to the final stage of the US Economic Development Administration's awards competition with a proposal focused on manufacturing quantum technologies.

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[READ ABOUT THE BLOCH >](#)



Leaders break ground at IQMP

Leaders from industry, government, and academic institutions gathered in September to officially break ground for the IQMP, led by UIUC in close partnership with UChicago, Northwestern, Argonne, Fermilab, and other organizations. "The Illinois Quantum and Microelectronics Park is about more than technology; it is about transformation for South Chicago," said Chicago Mayor Brandon Johnson. IQMP and its partners have made community engagement and workforce development a core priority. The CQE co-leads workforce development at the park, including a pilot program focused on aligning training with the specific needs of quantum employers, beginning with cryogenic roles.

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Infleqtion, Pasqal, Diraq to join quantum park

Infleqtion, Pasqal, and Diraq announced plans to join the Illinois Quantum and Microelectronics Park as tenants. Infleqtion is expected to invest about \$50 million and headquarter its global quantum computing operations at the park. French company Pasqal will invest more than \$65 million and build its US headquarters at the park. Australian company Diraq, part of DARPA's Quantum Benchmarking Initiative, said it will operate out of a local innovation facility as part of IQMP's On-Ramp program before the park opens.

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PASQAL >](#)

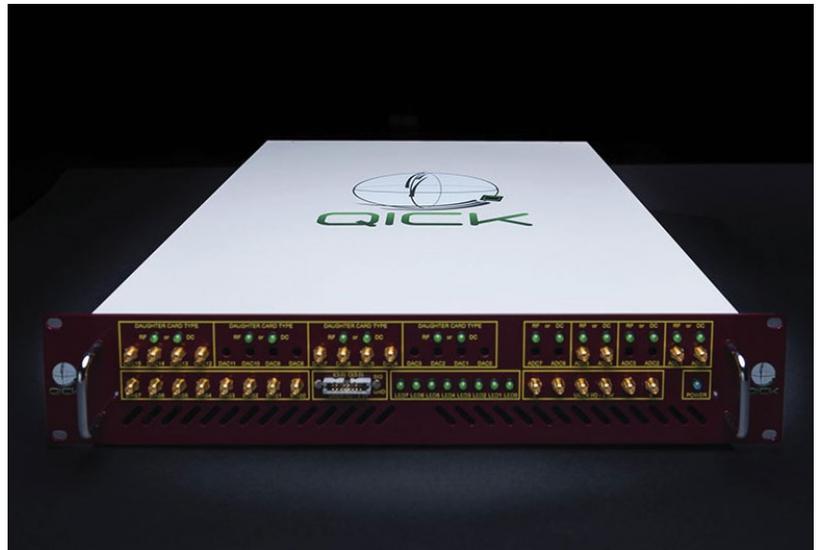
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Co-founder of UW–Madison startup awarded Nobel Prize in Physics

John M. Martinis, co-founder of startup Qolab, incubated at the University of Wisconsin–Madison, received the 2025 Nobel Prize in Physics in Stockholm in December. Along with Martinis, the Royal Swedish Academy of Sciences recognized John Clarke and Michel H. Devoret for their pioneering experiments demonstrating macroscopic quantum mechanical tunneling and energy quantization in electrical circuits.

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Fermilab, Qblox to manufacture foundational quantum control platform for US research and innovation

Fermi National Accelerator Laboratory and Qblox will manufacture and distribute the Quantum Instrumentation Control Kit (QICK) in the US, a platform for advancing quantum research and building a high-tech workforce. Facilitated by the US Department of Energy’s Office of Technology Commercialization, this effort marks an important step in advancing US capabilities in quantum computing, sensing, and networking. Developed by Fermilab, QICK is an open-source platform for managing quantum readouts and controls. It plays a critical role in synchronizing quantum processors and sensors, making it a foundational technology for the growing quantum ecosystem.

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CHICAGO QUANTUM SUMMIT

Record-breaking Chicago Quantum Summit draws more than 1,100 people in person and online

In-person attendees represented:

168
companies

28
US states

32
US universities

15
countries



RESEARCH AND DISCOVERY



Q-NEXT, SQMS renewed at \$125M each

Based at Argonne and Fermilab, the two DOE quantum centers are among five to receive added funds announced at Summit

The US Department of Energy will spend \$625 million to renew its five National Quantum Information Science (QIS) Research Centers, DOE Under Secretary of Science Darío Gil announced at the 2025 Chicago Quantum Summit. Two of the five centers are in the Chicago Quantum Exchange region: Q-NEXT, led by Argonne National Laboratory, and Superconducting Quantum Materials and Systems Center (SQMS), led by

Fermi National Accelerator Laboratory. “Breakthroughs in QIS have the potential to revolutionize the ways we sense, communicate, and compute, sparking entirely new technologies and industries,” Gil said. “The renewal of DOE’s National Quantum Information Science Research Centers will empower America to secure our advantage in pioneering the next generation of scientific and engineering advancements needed for this technology.”

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ABOVE: US Department of Energy Under Secretary of Science Darío Gil announces the \$625 million quantum research centers renewal at the Chicago Quantum Summit on November 4, 2025. (Image by Anne Ryan)



Benjamin Soloway, a University of Chicago Pritzker School of Molecular Engineering (UChicago PME) quantum PhD candidate in David Awschalom's lab, and Jacob Feder, a former student of Awschalom and Peter Maurer, were co-first authors of a paper about protein qubit research. Awschalom, Liew Family professor of molecular engineering, and Maurer, assistant professor of molecular engineering, both at UChicago PME, are co-principal investigators of the project. (Image by Jason Smith)

UChicago scientists program cells to create biological qubit in multidisciplinary breakthrough

Advance opens possibilities for precision measurements of tissues, single cells, or even individual molecules

In a first-of-its-kind breakthrough, researchers in the labs of David Awschalom and Peter Maurer at the University of Chicago's Pritzker School of Molecular Engineering turned a protein found in living cells into a functioning quantum bit, or qubit, the foundation of quantum technologies. The interdisciplinary advance was published in *Nature*.

Protein qubits can be built directly by cells, positioned with atomic precision, and detect signals thousands of times stronger than existing quantum sensors. Looking ahead, these protein qubits could drive a revolution in quantum-enabled nanoscale MRI, revealing the atomic structure of the cellular machinery and transforming our way to perform biological research.

The new protein qubits don't yet rival the sensitivity of today's best quantum sensors, usually made from defects in diamond. But because they can be genetically encoded into living systems, they promise something far more radical: the ability to watch biology unfold at the quantum level, from protein folding and enzyme activity to the earliest signs of disease. *Physics World* named the advance one of the magazine's Top 10 Breakthroughs of 2025.

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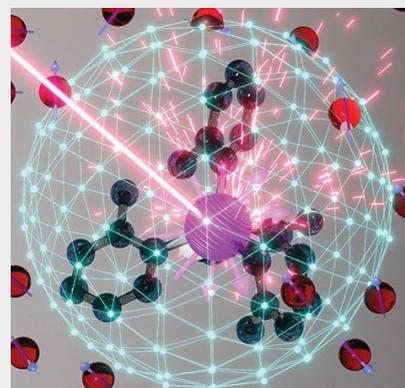
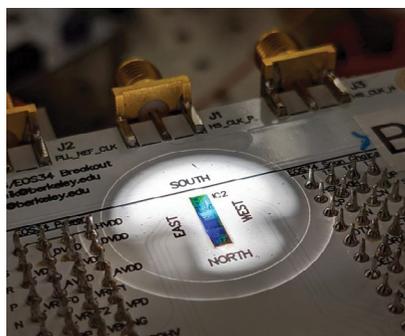


Photo credit: Dan Laurenza/MIT

UChicago, Northwestern, Purdue among eight awardees in \$10M collaborative quantum chemistry effort by NSF and UKRI

Teams at three CQE institutions — the University of Chicago, Northwestern, and Purdue — are among eight joint research projects receiving funding from the US National Science Foundation and United Kingdom Research and Innovation (UKRI) as part of a \$10 million effort to drive breakthroughs in quantum computing, ultra-precise navigation, and secure communications. The effort is supported by \$4.7 million from NSF and £4.2 million from UKRI's Engineering and Physical Sciences Research Council. Each project brings together US and UK researchers to tackle an underexplored area in science: how quantum information affects chemical reactions and molecular systems and how that knowledge can be put to use.

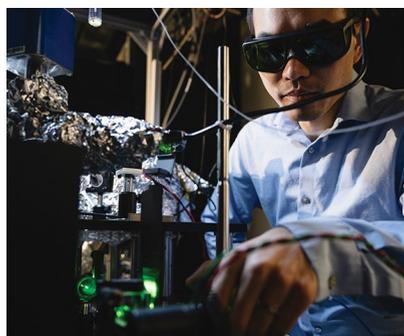
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NU produces first electronic-photonic quantum chip manufactured in commercial foundry

For the first time, scientists at Northwestern University have built a tiny photonic quantum system into a traditional electronic chip. This photonic-electronic integration enables the single chip to reliably produce a stream of photon pairs — basic units that encode quantum information — required for light-based quantum communication, sensing, and processing. A commercial semiconductor foundry fabricated the chip, demonstrating its ability to be manufactured for large-scale production. The study, which included work from the Prem Kumar group, was published in the journal *Nature Electronics*.

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Purdue work to improve NMR spectroscopy resolution could have quantum comms, computing applications

Quantum researchers at Purdue University are advancing an approach that could improve the resolution of NMR spectroscopy to the atomic scale and may also have applications in developing quantum computing and quantum communications. In research published in *Nature*, Professor Tongcang Li led a team that embedded the rare carbon 13 isotope in ultrathin hexagonal boron nitride and then used magnetic resonance microscopy to obtain atomic-level information about the structure of the material they created.

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UW–Madison trapped-atom qubit tech leads to industry-ready product

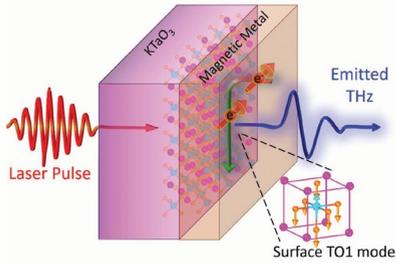
Engineers and physicists at the University of Wisconsin–Madison have developed a simplified but ingenious method for trapping atoms of different species to make qubits: capturing two types of neutral atoms next to each other, the method creates interleaved grids of cesium and rubidium atoms that can be used as qubits in quantum computing and quantum sensing. The setup is much simpler and more cost-effective than previous efforts and is already being used in early-stage quantum devices. The research, a collaboration of the Mikhail Kats and Mark Saffman groups, appears in the journal *Science Advances*.

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“The goals we have set will not be realized by any single lab or single investigator or even a single company. ... Building a new capability for science requires partnering across fields, institutions, and sectors.”

DARÍO GIL, the US Department of Energy’s under secretary for science, while announcing \$625 million in quantum centers renewal funding at the 2025 Chicago Quantum Summit.



Argonne’s new nanoscale technique unlocks quantum material secrets

Scientists at the US Department of Energy’s Argonne National Laboratory, including CQE researchers Michael Norman and Haidan Wen, have unveiled a new technique that provides an unprecedented look at how quantum materials behave at interfaces. Their innovation, surface-sensitive spintronic terahertz spectroscopy, allows researchers to study surface phonons — the collective vibrations of atoms at a material’s surface or interface between materials — opening new avenues for research and applications. The result is published in *Science Advances*.

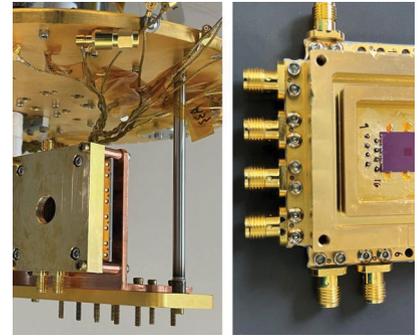
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Measurement tool developed at UIUC exploits quantum properties of light

University of Illinois Urbana-Champaign researchers in Paul Kwiat’s group have developed a revolutionary new tool for precision measurement at the nanometer scale. This new optical interferometry technology leverages extreme color entanglement — a quantum property of light — to enable faster and more precise measurements than widely used classical and quantum techniques can achieve. The new technology, published in *Science Advances*, has ready applications in medical diagnostics, remote system monitoring, and material characterization.

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Fermilab researchers advance quantum sensing for future detectors

In a study published in *Journal of Instrumentation*, Fermilab researchers led by Cristián Peña found that superconducting microwire single photon detectors, or SMSPDs, are able to detect a variety of particles with impressive detection efficiency, making them a promising technology to advance particle physics research and dark matter detection. This achievement represents a significant step toward developing advanced detectors for next-generation particle physics experiments.

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270+

Researchers across member institutions

684

Quantum computing articles between 2019 – 2025 from UChicago, Purdue, placing them among US leaders

\$250M

Funding to Q-NEXT and SQMS through DOE centers renewal



POWERING THE QUANTUM PRAIRIE



The Bloch Quantum Tech Hub attracts open-access cryo labs, boosting region's innovation capacity

Ultra-cold labs and cryogenic systems are essential tools for quantum innovation, training, and discovery. The region's expanding capacity will help startups and create new jobs.

ABOVE: A dilution refrigerator at Chicago-based mHUB, marking the first US location for the Bluefors Lab Service. Bluefors later opened a second Chicago location at Hyde Park Labs. (Image courtesy of Bluefors)

Cryogenics, the science of producing and working at low temperatures, is foundational to much of the quantum ecosystem. And the Midwest is a growing hub for this specialized equipment, thanks in part to the EDA-designated Bloch Quantum Tech Hub's work attracting Bluefors, the world leader in manufacturing dilution refrigerators and cryogenic measurement systems for quantum technology.

In early 2025, the CQE-led Bloch increased the region's innovation capacity by helping bring Bluefors to Chicago-based mHUB. It was

the first US location for the Bluefors Lab Service. Later that year, Bluefors opened a second Chicago-based lab facility at the UChicago Science Incubator at Hyde Park Labs, a commercial laboratory facility that opened on Chicago's South Side in 2025.

“The Midwest’s expanding cryogenic infrastructure is ... making us a destination for quantum companies who need access to super-cooling. The growing demand for this equipment, in turn, is making the Midwest a destination for cryo companies and facilities.”

PROFESSOR DAVID AWSCHALOM,
founding director of the Chicago
Quantum Exchange

This growth also means jobs. Cryogenic roles span a range of levels, from technicians and cryoplant operators (jobs that generally require associate degrees or high school diplomas), to cryogenic mechanical engineers (jobs that require bachelor's degrees), to cryogenic systems engineers (jobs that generally require graduate degrees).

“The people that maintain cryogenic systems already are in high demand, and we expect availability of these jobs to rise exponentially in the Illinois-Wisconsin-Indiana region over the next decade,” said CQE Director of Education and Workforce Development Emily Easton. “This represents a huge need for our sector — and a huge opportunity for the community.”

Cryogenic capacity was part of the draw for quantum computing company and CQE corporate partner PsiQuantum, which announced in 2024 that it will anchor the Illinois Quantum and Microelectronics Park (IQMP) being built on the South Side of Chicago. The IQMP a first-of-its-kind campus for quantum scale-up, will include an industrial-scale cryogenic plant accessible to tenants of the park.

Even before these developments, the Midwest had a deep bench of expertise in cryogenics, including Ohio-based CQE corporate partner Lake Shore Cryotronics, which was founded in 1968, and the US Department of Energy's Fermi National Accelerator Laboratory in Batavia, Illinois. Fermilab's original core focus — particle physics — has used large-scale cryogenics for decades.

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Exterior photo of Hyde Park Labs. (Image by Anne Ryan for the University of Chicago)

Hyde Park Labs and UChicago Science Incubator launch to turn research into real-world solutions

Hyde Park Labs, a new commercial laboratory facility that will help advance science research and entrepreneurship on Chicago's South Side, opened in September 2025. The facility includes space for academic research, science-based companies, and the UChicago Science Incubator, which will accelerate discoveries into companies and real-world solutions in areas including the life sciences, quantum, AI, and the climate. CQE corporate partner memQ was announced as a tenant. The building will house IBM's Quantum System 2, and IBM researchers affiliated with the National Quantum Algorithm Center will be located in the nearby Harper Court building.

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“Investment in quantum can enhance our national security, help cure diseases, bend the curve on climate change, protect our financial system, and so much more — and I’m eager to see these advancements help bolster the strength of our state and region’s manufacturing.”

US SENATOR TAMMY DUCKWORTH



CQE community tackles manufacturing, federal investment in meetings with US leaders

The Bloch Quantum Tech Hub convened more than a dozen leaders from manufacturing and research to meet with US Senator Tammy Duckworth to discuss how Illinois can harness quantum advancements to bolster Illinois’s manufacturing power. Congressman Raja Krishnamoorthi met with the CQE community and local leaders to talk about the region’s quantum future. And UChicago convened academic, government, and industry leaders for a briefing on Capitol Hill about the need for continued investment in quantum tech.

[DUCKWORTH VISIT >](#)

[KRISHNAMOORTHI VISIT >](#)

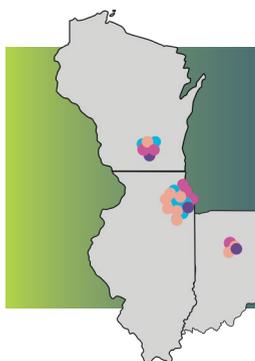
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UChicago receives \$21M to establish visionary center in quantum engineering and health

A \$21 million gift from philanthropist Thea Berggren to the University of Chicago will establish the Berggren Center for Quantum Biology and Medicine, launching a bold scientific field that merges quantum technology with biology to transform the future of medicine. This pioneering, interdisciplinary effort seeks to harness the power of quantum engineering — capable of the most sensitive measurements known to science — to peer inside the human body in unprecedented ways. The goal is to unlock insights into biology and disease that were previously out of reach, paving the way for new diagnostics and therapies.

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DID YOU KNOW?

The CQE Founders Platform supports the more than 30 quantum companies growing in the region.

[SEE THE LIST >](#)

[VIEW THE ONLINE MAP >](#)



Purdue builds quantum network testbed

Purdue University has successfully demonstrated a functioning quantum network that distributes photonic entanglement between three laboratories on campus. The system can perform quantum key distribution protocols that create secret keys known only to authorized users. It also enables advanced research techniques such as ancilla-assisted quantum process tomography, an approach that allows researchers to characterize quantum channels using entanglement.

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UW-Madison startup awarded funding to tackle water challenges

Dirac Labs, incubated at the University of Wisconsin-Madison, is one of five companies selected by the Great Lakes Innovation Accelerator to tackle pressing water challenges in the region. Dirac Labs, which is developing quantum sensors for navigation in GPS-denied waters and monitoring underwater infrastructure, received \$100,000 in non-dilutive grant funding and participated in an intensive three-month program.

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“The collaboration and the ecosystem in this region are definitely on another level. The universities, the national labs, and all the companies growing from that ecosystem ... made it an easy choice for us to be there.”

SAULI SINISALO, vice president and general manager at the Bluefors US headquarters

30+

Quantum companies growing in region

5,700+

Square feet of new dedicated quantum space at mHUB and Hyde Park Labs

\$21M

Gift to establish the Berggren Center for Quantum Biology and Medicine at UChicago



TRAINING AND EDUCATION



CQE and national partners convene industry, education leaders to shape national quantum workforce strategy

Quantum Education & Policy Summit, hosted by two NSF Quantum Leap Challenge Institutes in partnership with CQE and QED-C, drew participants from 27 states

When Joanne Ivory first arrived at the Quantum Education & Policy Summit in October, she was only beginning to learn about quantum information science and technology. Harper College, the Chicago-area community college where she serves as dean of career and technical programs, had joined the US Economic Development Administration-designated Bloch Quantum Tech Hub, and she wanted to boost her knowledge and connect with other educators to better support her institution's efforts.

ABOVE: Emily Easton, director of education and workforce development at the CQE and a key organizer of the Quantum Education & Policy Summit, directs a regional breakout session focusing on the Midwest. (Image by Greg Dohler / Asico Photo)

By the end of the event, she said she felt more informed and better equipped to support her college and her students.

“I feel like my brain is absolutely full,” she said. “I’ve learned so much from everyone in the last two days.”

“There’s incredible momentum in regional quantum ecosystems across the country. But if we want to build a truly national quantum workforce, those regional strengths have to connect. Meetings like this are where that alignment starts to happen.”

EMILY EASTON, the CQE’s director of education and workforce development

The event, held at the University of Maryland, was hosted by Quantum Systems through Entangled Science and Engineering and the Institute for Robust Quantum Simulation — both National Science Foundation (NSF) Quantum Leap Challenge Institutes — in partnership with the CQE and the Quantum Economic Development Consortium with funding from the NSF.

The Quantum Education & Policy Summit drew participants from 27

states across the country. Some traveled from community colleges, both rural and urban, others from large research universities. All shared the same mission: to build a more connected and inclusive ecosystem for quantum education in the US.

“There’s incredible momentum in regional quantum ecosystems across the country,” said Emily Easton, the CQE’s director of education and workforce development and a key organizer of the event. “But if we want to build a truly national quantum workforce, those regional strengths have to connect. Meetings like this are where that alignment starts to happen.”

Many educators in attendance emphasized the need for deeper partnerships with industry and the important role of community college programming.

One panel focused on strategies for developing programs to meet the emerging needs of the quantum sector, especially given the uncertainties around which specific needs will arise and when.

Stacia Edwards, the deputy provost of City Colleges of Chicago, said existing programs offer a strong foundation.

“As we’re thinking about technical education for quantum,” she said, “we are going to use our engineering technology program as a base.”

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“Teaching students about how the world works at the quantum level and how quantum technology could transform our life is imperative in this rapidly changing world.”

YOUNG-KEE KIM, then-interim director of Fermilab



Fermilab program builds pathways to quantum for CPS students

Forty high school students in Chicago Public Schools (CPS) graduated from Fermi National Accelerator Laboratory’s Saturday Morning Quantum* (SMQ*) — the asterisk meaning “more” — program in May. The inaugural 10-week program was held at the Olive-Harvey College Learning Center in Chicago’s South Shore community; Olive-Harvey College is one of the City Colleges of Chicago. The classes were taught by quantum scientists and subject-matter experts to inspire the next generation of quantum researchers. SMQ* was developed by Fermilab’s Education and Public Engagement team along with the lab’s Superconducting Quantum Materials Systems team to bring a quantum science curriculum to high school students in the city of Chicago.

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Dr. Lucinda Boyd explains how to work an atomic force microscope at the Quantum Sensing Summer Program at Chicago State University. (Image by Anne Ryan)

Chicago State University’s quantum education programs help students ‘imagine themselves working in the field’

One program, the Quantum Sensing Summer Program with NSF QuBBE, offers Chicago high schoolers two weeks of lab immersion

On a hot morning in June, a high school student in safety goggles hovered over a lab table with tweezers, hesitating. She was supposed to pick up a cantilever tip — a tiny piece of metal smaller than a grain of rice — for the atomic force microscope behind her. She was part of the Quantum Sensing Summer Program, which brings local high school students into labs at Chicago State University and other local institutions to learn about quantum technology. The program is administrated through the National Science Foundation’s Quantum Leap Challenge Institute for Quantum Sensing for Biophysics and Bioengineering (QuBBE), of which CSU is part. It is just one piece of CSU’s broader and growing efforts in quantum education.

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232

Students enrolled since 2022 in the online Quantum Science, Networking, and Communications course co-managed by CQE and taught by UIUC and UChicago faculty

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Students at Powell Elementary School in South Chicago play with a kit from the Wonders of Quantum Physics program. (Image by Meredith Fore)

Wonders of Quantum Physics reaches 10,000+ students in 27 states

From the mysteries of light waves to the strange behavior of particles, the Wonders of Quantum Physics program — launched as an offshoot of a University of Wisconsin–Madison outreach effort — brings quantum science into classrooms. Developed through the Hybrid Quantum Architectures and Networks (HQAN) center, a Quantum Leap Challenge Institute funded by the National Science Foundation and led by the University of Illinois Urbana-Champaign, the program designs hands-on experimental kits. It has distributed more than 2,700 kits to K–12 students in 27 states. In 2025, the CQE leveraged a network built for the NSF Engines development award to increase distribution across Wisconsin and Illinois, providing 675 kits to about 6,200 K–12 students in both states.

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UChicago, IBM advance global effort to bring quantum ed to 40K students

IBM, Keio University, the University of Tokyo, Yonsei University, Seoul National University, and the University of Chicago have reached thousands in their effort to bridge the “skills gap,” the numerical mismatch between the increasing number of quantum job openings and the relatively few qualified candidates available to fill them. The global effort, launched in late 2023, aims to prepare 40,000 students for the future quantum workforce over the next 10 years.

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400+

Participants in 2025 Chicago Quantum Recruiting Forum

76

Open Quantum Initiative fellowships since 2022

63

Boeing Quantum Creators since 2021



BUILDING THE QUANTUM ECONOMY



CQE releases Quantum Law Navigator to help ‘innovators turn complexity into opportunity’

In the coming decades, quantum technologies could reshape how we fight disease, run our cities, secure our data, and defend our country. But this transformative potential, closely tied to economic and national security, complicates the sector’s interactions with legal frameworks. The result is layers of laws and regulations that can impede stakeholders’ access to global talent, foreign equipment, public funding, and more.

ABOVE: Robert W. Karr Jr., partner at Barnes & Thornburg and co-founder of the firm’s Quantum Technology Industry Group; Hannah Parnes, head of policy at EeroQ; and Troy Smith, general counsel at Infleqtion, discuss the Quantum Law Navigator on a panel titled Legal Frameworks for Quantum Growth at the 2025 Chicago Quantum Summit on November 3. (Image by Anne Ryan)

That's why the Chicago Quantum Exchange and Barnes & Thornburg LLP released a new report that helps equip researchers, founders, executives, investors, in-house counsel, and policymakers with the tools to understand the complex intersection of quantum innovation and legal regimes. The Quantum Law Navigator™ maps the US legal landscape shaping the quantum industry and provides analysis of four cross-cutting challenges — national security, funding, workforce, and supply chain — to help organizations translate complex rules into actionable strategy.

“The Quantum Law Navigator will help innovators turn complexity into opportunity and strengthen the foundation of a growing quantum economy. This effort underscores the kind of leadership that keeps Illinois at the center of global innovation.”

ILLINOIS GOVERNOR JB PRITZKER

Quantum researchers and companies routinely encounter

laws with complex compliance requirements, but they arrive at their first legal questions with different sets of tools. They may stumble into their first patent question, run afoul of deemed export rules that prohibit certain discussions with foreign researchers, or encounter a tangle of rules that impede the acquisition of essential components and materials. They might accept federal funding and need to understand obligations related to ownership, intellectual property, and disclosure. They might be concerned about march-in rights, which allow the government to grant a compulsory license on a privately owned patent to third parties. Or they might need help negotiating a first venture capital deal or navigating visa requirements for foreign talent.

Large, well-funded research institutions and companies can retain legal teams to navigate these questions, but smaller, less resourced stakeholders often cannot. Compliance remains costly, confusing, and often discouraging for both groups.

“The Quantum Law Navigator will help innovators turn complexity into opportunity and strengthen the foundation of a growing quantum economy,” said Governor JB Pritzker. “This effort underscores the kind of leadership that keeps Illinois at the center of global innovation.”

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“Lawmakers and regulators have increasingly turned their attention to quantum because quantum technologies have the potential for seismic impact on many sectors of industry and society. The Quantum Law Navigator provides a foundation for understanding the legal and regulatory landscape for the development of quantum technology and will be an invaluable asset for innovators across the quantum ecosystem.”

HANNAH PARNES, head of policy,
EeroQ



Six CQE partners among 11 companies chosen for second stage of DARPA program

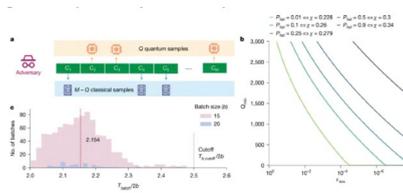
Six CQE partners are among 11 quantum computing companies chosen for the second stage of DARPA's Quantum Benchmarking Initiative, which aims to rigorously validate whether any quantum computing approach can achieve utility-scale operation by the year 2033. The companies are Atom Computing, IBM, IonQ, Quantinuum, QuEra Computing, and Xanadu.

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New Microsoft Quantum qubit platform contains materials developed at Purdue

Microsoft Quantum published an article in *Nature* detailing recent advances in the measurement of quantum devices that will be needed to realize a topological quantum computer. Among the authors are Microsoft scientists and engineers who conduct research at Microsoft Quantum Lab West Lafayette, located at Purdue University.

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Researchers from Quantinuum, Argonne demonstrate certified quantum randomness

In a paper in *Nature* published in March, a team of researchers from JPMorgan Chase, Quantinuum, Argonne National Laboratory, Oak Ridge National Laboratory, and the University of Texas at Austin achieved a critical industry milestone by demonstrating a potential application of a quantum computer. Randomness has many industrial uses, from solving complex mathematical problems to applications in cryptography and more. The group conducted the first successful demonstration of a novel quantum computing protocol to generate certified randomness.

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Quantum Corridor, Toshiba demonstrate cross-state QKD

The collaboration to demonstrate quantum-secured communication over a live commercial fiber network between data centers in Illinois and Indiana grew from the CQE partnership program.

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CQE IN THE NEWS

CQE researchers and institutions are strengthening the reputation of the Illinois-Wisconsin-Indiana quantum ecosystem. Here are highlights of their media coverage.

Gov. JB Pritzker hails Chicago as leading quantum computing hub
CBS News

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Quantum computing has arrived; we need to prepare for its impact
Forbes

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PsiQuantum breaks ground on Chicago quantum site
Reuters

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Chicagoland vies for a quantum leap in computing
Inc.

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'A real physical thing': Quantum computer exhibit at O'Hare seeks to make the technology tangible
Chicago Tribune

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Quantum law report maps legal minefield for America's quantum tech frontier
Quantum Insider

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Hyde Park Labs brings lab space for cutting-edge STEM startups spun out of University of Chicago
CBS News

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Chicago lands another quantum computer maker
Crain's Chicago Business

[READ MORE >](#)

Chicago's quantum computing center a benefit of tolerance
Chicago Sun-Times

[READ MORE >](#)

Pritzker scores quantum win as Australian firm picks Chicago hub
Bloomberg

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SELECTED CQE PATENTS

The following technologies from CQE-affiliated faculty members are available for licensing.

Title: Methods and systems for protecting coherence in qubits

Owner: University of Chicago

Full Inventor List: David Awschalom, Kevin Miao

US or International Patent App. No.: US-2023-0314374-A1

Institutional contact name and email:
Eric Ginsberg, ginsburg@uchicago.edu

Title: Photon-number dependent Hamiltonian engineering for resonators

Owner: University of Chicago, Yale University

Full Inventor List: Steven Girvin, Liang Jiang, José Lebreuilly, Kyungjoo Noh, Chiao-Hsuan Wang

US or International Patent App. No.: US-2024-0303520-A1

Institutional contact name and email:
Eric Ginsberg, ginsburg@uchicago.edu

Title: Controlled photon Fock state generation using arbitrarily weak photonic nonlinearities

Owner: University of Chicago

Full Inventor List: Aashish Clerk, Andrew Lingenfelter

US or International Patent App. No.: US-2023-0267361-A1

Institutional contact name and email:
Eric Ginsberg, ginsburg@uchicago.edu

Title: Fabrication of normal conducting or low-gap islands for downconversion of pair-breaking phonons in superconducting quantum circuits

Owner: University of Wisconsin–Madison

Full Inventor List: Robert McDermott, Britton Plourde

US Patent No.: US-20250380620-A1

Institutional contact name and email:
Emily Bauer, emily@warf.org

Title: Light extractor from near-surface solid-state color centers

Owner: University of Wisconsin–Madison

Full Inventor List: Mikhail Kats, Jennifer Choy, Minjeong Kim

US or International Patent App. No.: 19/186168

Relevant publication: Kim, M., et al. Broadband light extraction from near-surface NV centers using crystalline-silicon antennas. (2025).

Publication link/doi: <https://doi.org/10.1021/acs.nanolett.4c04299>

Institutional contact name and email: Emily Bauer, emily@warf.org

Title: Systems and methods for enhanced quantum error correction via adaptive leakage mitigation

Owner: University of Wisconsin–Madison

Full Inventor List: Swamit Tannu, Chaithanya Mude

US or International Patent App. No.: 19/360260

Institutional contact name and email:
Emily Bauer, emily@warf.org

Title: Creation of optically stable quantum emitters

Owner: Board of Trustees of the University of Illinois, UChicago Argonne LLC

Full Inventor List: Benjamin Diroll, Haihua Liu, Hanyu Hou, Jianguo Wen, Muchuan Hua, Thomas Gage, Wei-Ying Chen, Jian-Min Zuo

US or International Patent App. No.: 18/655,088

Relevant publication: Hou, H., et al. High-resolution STEM cathodoluminescence of 2D exfoliated quantum emitters. (2024).

Publication link/doi: <https://doi.org/10.1093/mam/ozae044.005>

Institutional contact name and email:
Shreya Ghosh, sghosh9@illinois.edu

Title: Nanophotonic nonlinear bell state analyzer

Owner: Board of Trustees of the University of Illinois

Full Inventor List: Joshua D. Akin, Kejie Fang, Elizabeth A. Goldschmidt

US or International Patent App. No.: 63/898,852

Relevant publication: Akin, J., et al. Faithful quantum teleportation via a nanophotonic nonlinear Bell state analyzer. (2025).

Publication link/doi: <https://doi.org/10.1103/PhysRevLett.134.160802>

Institutional contact name and email:
Kyle Shelton, kshelto@illinois.edu

Title: Noble gas solid-state single electron qubit platform

Owner: UChicago Argonne LLC

Full Inventor List: Dafei Jin, Xianjing Zhou, Gerwin Koolstra, Ge Yang, David I. Schuster

US Patent No.: US-12254999-B2

Relevant publication: Zhou, X., et al. Single electrons on solid neon as a solid-state qubit platform. (2022).

Publication link/doi: <https://doi.org/10.1038/s41586-022-04539-x>

Contact: partners@anl.gov

Title: Colloidal quantum fountains

Owner: UChicago Argonne LLC

Inventor: Benjamin Diroll

US Patent No.: US-20230268709-A1

Contact: partners@anl.gov

CHICAGO QUANTUM EXCHANGE

chicagoquantum.org
quantum@uchicago.edu



ABOVE: Ahnnika Hess (left), a 2025 Open Quantum Initiative fellow who worked in Prem Kumar's lab at Northwestern University, and Gina Talcott, a Northwestern graduate student in applied physics, work in Kumar's lab. Kumar is a professor of electrical and computer engineering, director of Northwestern's Center for Photonic Communication and Computing, and an Executive Committee member of the Institute for Quantum Information Research and Engineering (INQUIRE).

