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COMMUNITY COLLEGE DISTRICT NO. 508
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From Community to Quantum

A Component Project of the
EDA Tech Hub Bloch

CITY COLLEGES[®]
OF CHICAGO

What is Quantum?

- A branch of physics that has been around for a long time
- Focuses on the behavior of matter and energy at very small scale-think atoms and smaller
- We use products today that have been discovered through quantum theory and application
 - MRI
 - Transistors
 - Lasers

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Opportunity

- The Bloch is a Regional Tech Hub funded by the Federal Department of Commerce focused on Quantum at UChicago
- Successful first round application unlocked opportunity to apply for Round 2 funding
- Economic Development Administration (EDA) of the Department of Commerce will fund 3 to 8 aligned projects that address the region's key inhibitors of global competitiveness
- Project types in Chicago
 - Industry Solutions
 - Infrastructure Network
 - Education and pathways to help fill workforce needs for our growing ecosystem

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Opportunity

- CCC presented with a leadership opportunity for component project
- Scope of the project covers the entire MSA and emphasizes creation of an inclusive and racially diverse workforce in Quantum
- CCC agreed to be the fiscal agent and management lead with Harper College as a co-lead for the workforce component project
- Key partnerships were developed with Ivy Tech Community College in Indiana and Gateway Technical College in Wisconsin

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Elements of the Workforce Proposal- 3 Pillars

Pillar 1

Robust and diverse network of educators and facilities increasing equity, inclusivity and accessibility

Pillar 2

New and expanded employer partnerships centered on work-based learning and industry adoption support

Pillar 3

Industry-driven curricula for secondary to post-secondary, stackable credentials and university partnerships

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Robust and Diverse Network of Educators and Facilities Increasing Equity, Inclusivity, and Accessibility

Key Strategies and Outcomes

Pillar 1

1. Establish four QuNetwork Centers leveraging existing infrastructure and resources at CCC, Harper, Ivy Tech, and Gateway and provide state-of-the-art physical and virtualization labs, classrooms, and simulation spaces providing immersive, hands-on learning experiences and exploration space for students, educators, and startups
2. Align programs and services offered at each of the QuNetwork Centers with local community's unique needs, priorities, opportunities, and industry demands
3. Foster strong coordination and collaboration among community colleges and other regional stakeholders to ensure seamless delivery of programs across all QuNetwork Centers
4. Establish Quantum Learning Community and repository of shared curricula, educational materials, open educational resources, and professional development resources for educators, ensuring culturally inclusive quantum education, deep understanding of quantum concepts, and effective teaching methodologies for delivery of high-quality education
5. Build quantum awareness in our local communities through outreach that inspires and offers individuals exploratory, innovative ways to learn quantum concepts, including K-12 outreach, exploration days, early college lab visits, community workshops, and industry/employer training
6. Create a sustainable and scalable model for QuNetwork Centers that ensures long-term viability, growth, and community and economic impact

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Pillar 1 - Outcomes

- **Enhanced Access to High Quality Quantum Education**
- **Strengthened Regional Economic Growth and Innovation**
- **Unified Network of QuNetwork Centers**
- **Community-Centric Programming**
- **Culturally Inclusive Educational Environment**
- **Enhanced Educator Proficiency**
- **Increased Quantum Literacy**

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New, Expanded, Strengthened Employer Partnerships Centered On Work-Based Learning and Support for Industry Adoption

Key Strategies and Outcomes

1. Forge strategic partnerships with BILT members in quantum and related fields to co-create work-based learning programs that result in a diversified portfolio of programs directly reflecting real-world industry needs and enhancing student employability and readiness for the quantum workforce
2. Expand Registered Apprenticeship Programs into more technology and quantum-related fields with BILT members and Bloch partners
3. Collaborate with the Corner Store of the Bloch to facilitate paid internship placements at quantum-focused companies using a dedicated portal for From Community to Quantum participants and other community college students across the MSA
4. Partner with specific educational institutions (e.g., UIC, UIUC, UChicago, Purdue NW), governmental agencies (e.g., EDA, ANL, ICCB) and leading industry partners (e.g., IBM, mHub, Microsoft) to launch targeted programs aimed at driving technological progress, fostering innovation, and shaping policy reforms; focus on accelerating the adoption of quantum technologies into operational frameworks of key sectors; and prioritize the development and expansion of a highly-skilled workforce equipped with quantum expertise to meet growing demands of industry

Pillar 2

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Pillar 2 - Outcomes

- **New, Strengthened Industry Partnerships**
- **Expanded Apprenticeship Programs**
- **Enhanced Pathways for Students and Job Seekers**
- **Centralized Internships**
- **Dedicated Internship Portal**

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Industry-Driven Curricula for Secondary to Post-Secondary, Stackable Credentials, and University Transfer Pathways

Key Strategies and Outcomes

Pillar 3

1. Develop robust industry-driven curricula in partnership with BILT advisory councils to co-lead curriculum development with faculty using an established, iterative process for validating and prioritizing technician-level knowledge, skills, and abilities annually for each key industry sector.
2. Initiate sector-based BILT advisory councils, starting with quantum-ready fields like financial services, ensuring curriculum development is grounded in real-world applications and emerging industry trends, fostering relevance and immediacy in skill acquisition.
3. Offer stackable credentials, including short-term certificates, associate degrees, specialized certifications, and opportunities for up/reskilling current workers as industry sectors adopt quantum.
4. Expand dual credit options to strengthen pathways from secondary to postsecondary education that create seamless transition to community colleges, crucial for maintaining student engagement and success in technology and quantum fields.
5. Enhance outreach to middle school students to address need for early quantum exposure and the development of a diverse, inclusive workforce.
6. Offer scalable university transfer pathways with four-year university partners to provide flexible and accessible options for seamless transfer for students using the proven Engineering Pathways model.
7. Implement support initiatives for food, housing, transportation, childcare, etc. to directly address barriers to retention, persistence, and completion rates among students, particularly those from underserved backgrounds, ensuring they have the support necessary to succeed.

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Pillar 3 - Outcome

- **Curriculum Alignment with Industry Needs**
- **Flexible Learning Pathways**
- **Streamlined Pathways to Higher Education**
- **Early Quantum Exposure and Inclusivity**
- **Expanded University Transfer Pathways**
- **Enhanced Student Support and Success**

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Budget

Total budget for the project

- \$22,439,153
- **Federal Share**
 - \$19,487,508
- **Non-Federal Share (Match)**
 - \$2,951,645

Match highlights:

- \$1,200,000 from state for internships
- \$175,000 from Microsoft for technical quantum computing support

CCC total

- \$6,739,494
- **CCC Federal Share**
 - \$6,169,851
- **CCC match**
 - \$569,643

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Partnerships

- **Committed partners include**

- IBM
- Microsoft
- Infleqtion
- qBraid
- Great Lakes Crystal Technologies
- Discover
- Argonne National Lab
- Fermi National Lab

- **Sub-contract partners**

- YWCA
 - Student engagement and wrap around supports
- GET Cities
 - Events and activities for recruitment and support of racially diverse populations
- Purdue Northwest
 - Infrastructure and program development support in NW Indiana
- UIUC
 - Faculty and grad student expertise for equipment and outreach
- Uchicago
 - Expanded internship program connected to labs and start-ups

From Community to Quantum Component Project

QUNETWORK CENTERS

- Primary fiscal, administrative, and programmatic responsibilities
- Chancellor is member of Bloch Steering Committee
- QuNetwork Center at Arturo Velasquez Institute in Chicago, IL

- Secondary fiscal, administrative, and programmatic requirements
- President is member of Bloch Steering Committee
- QuNetwork Center in Schaumburg, IL

- Covers WI areas of MSA
- QuNetwork Center in Kenosha, WI
- Serves on Advisory Council

- Covers IN area of MSA
- QuNetwork Center at XXX in Gary, IN
- Includes Gary Fiber Smart House
- Serves on Advisory Council

CITY COLLEGES OF CHICAGO PROJECT LEAD

HARPER COLLEGE PROJECT CO-LEAD

GATEWAY TECHNICAL COLLEGE

IVY TECH COMMUNITY COLLEGE

- Algorithm Development
- Quantum Software
- Risk Analysis
- Machine Learning/AI
- Computer Science
- Data Science/Analytics
- Physics
- Engineering
- Cybersecurity
- Artificial Intelligence
- Cloud Computing
- Software Development
- Quantum

FINANCIAL SERVICES

ENGINEERING & SCIENCES

ADVANCED & EMERGING TECHNOLOGIES

INDUSTRY CONNECTIONS

BIOTECH

ADVANCED MANUFACTURING

ENERGY

- Sensing and Imaging
- Molecular Control
- Chemical Simulation

- Sensors
- Lasers
- Photonics
- Materials Science

- Energy Optimization
- Exploration Sensing
- Metrology
- Cryptography for Secure Energy Infrastructure

EMPLOYER ENGAGEMENT

- **Business & Industry Leadership Teams (BILTs):**
- Industry-Driven Curricula and Programs Shared Across QuNetwork Centers
- Discuss Industry Trends 3-5 years into the future
- Annually validate KSAs for Quantum and Quantum-Adjacent Careers
- Co-create work-based learning programs
- **Work-Based Learning:**
- Internships
- Registered Apprenticeships
- Job Shadowing
- **Hiring Commitments**
- **Industry-Recognized Credentials**
- **Up/Reskilling Incumbent Workers**
- **Employer and Bloch Partners:**
- Discover
- IBM
- Microsoft
- Argonne National Lab
- Infleqtion
- qBraid

SECONDARY TO POSTSECONDARY PATHWAYS AND SUPPORT INITIATIVES

- **Other Community & Technical Colleges:**
- Northern Illinois Workforce Consortium (NIWC) Colleges
- Shared curricula
- Professional Development
- **K-12:**
- Middle and High School Partners
- Northwest Educational Council on Student Success
- Targeted outreach beginning in 7th grade
- **University Partners:** UIC, UIUC, UChicago, Purdue NW, UW-Parkside, NIU, Northwestern, CSU
- University Transfer Pathways
- Commitment to collaborate on curricula with industry input and accept for transfer
- Access to quantum technology
- **Community-Based Partners:** YWCA
- Wraparound Support Services
- Referrals/Recruitment
- Coaching/Career Readiness
- Community Engagement
- Data Collection

Questions?

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