

Center for Quantum Networks

NSF Engineering Research Center

Innovation Ecosystem

Alireza Shabani

Director of Strategic Partnerships and Innovation, University of Arizona

John Sawyer

Director of Strategic Research Initiatives, University of Maryland

Timothy Burt

Chair of Industry Advisory Board, L3Harris



UNIVERSITY OF
MARYLAND

University of
Massachusetts
Amherst



NAU
NORTHERN
ARIZONA
UNIVERSITY



UNIVERSITY OF
OREGON

IPP Membership — October 2025

Bronze



Silver



New!



New!



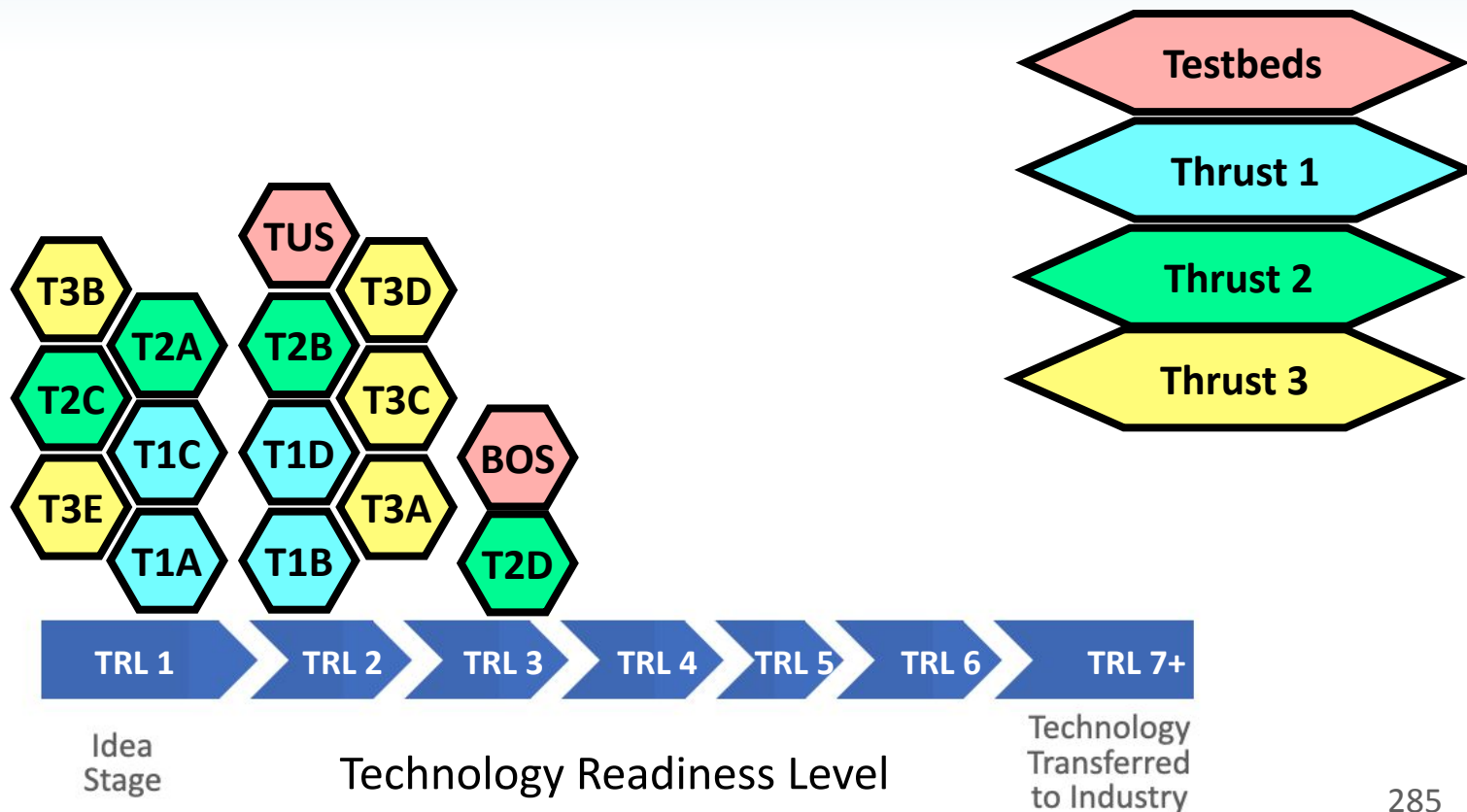
Gold



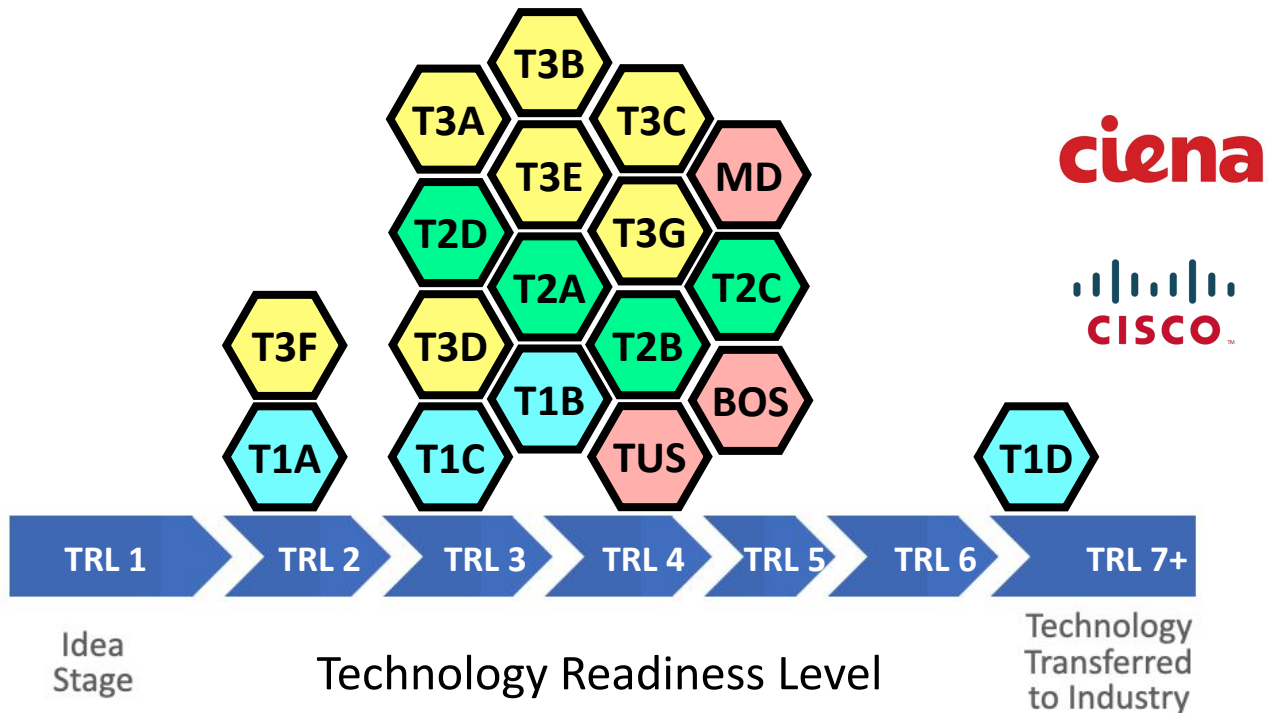
Diamond



2022 Technology Maturity Level



2025 Technology Maturity Level



Major Accomplishments Y1-5

- Total 25 and current 20 **members**: Major telecom and defense corporates, and midsize and startup companies. 80% retention.
- **117 Patents**: 29 Full + 88 Provisional
- 8 customized **research projects**, 10+ joint paper and patent publications with industry
- **Services**: Physical and Digital-Twin Testbeds
- **Entrepreneurship**: 6 spin-out companies
- **Education programs**: Masters programs, UArizona and UChicago

Joint CQN-Industry Research



All-photonic Gottesman-Kitaev-Preskill–qubit repeater using analog-information-assisted multiplexed entanglement ranking

Filip Rozpędek, Kaushik P. Seshadreesan, Paul Polakos, Liang Jiang, and Saikat Guha
Phys. Rev. Research **5**, 043056 – Published 18 October 2023

States, Modes, Fields, and Photons in Quantum Optics

Michael G. Raymer^{1*} and Paul Polakos²

¹. Department of Physics, and Oregon Center for Optical, Molecular and Quantum Science, University of Oregon, Eugene, OR 97403, USA

². Cisco Systems, New York, NY 10119, USA

Resource Management in Quantum Virtual Private Networks

Publisher: IEEE

Cite This



Shahrooz Pouryousef ; Nitish K. Panigrahy ; Monimoy Deb Purkayastha ; Sabyasachi Mukhopadhyay ; Gert Grammel ; Domenico Di Mola

Spread Photon Transceiver for Quantum Secure Communications

Publisher: IEEE

Cite This



Wesley Webb ; Michael S. Bullock ; Samuel H. Knarr ; Timothy C. Burt ; Jim A. Drakes ; Saikat Guha [All Authors](#)

Quantum Network Planning for Utility Maximization

Authors:  [Shahrooz Pouryousef](#),  [Hassan Shapourian](#),  [Alireza Shabani](#),  [Don Towsley](#)

Resource Placement for Rate and Fidelity Maximization in Quantum Networks

Publisher: IEEE

Cite This



Shahrooz Pouryousef  ; Hassan Shapourian  ; Alireza Shabani ; Ramana Kompella ; Don Towsley  [All Authors](#)

Spread-photon architecture for quantum-secure c

Publisher: IEEE

Cite This



Michael S. Bullock ; Wesley Webb ; Samuel H. Knarr ; Timothy C. Burt ; James A. Drakes ; Victor G. Bucklew [All Authors](#)

(12) **United States Patent**
Zhang et al.

(54) ENTANGLED
RADIOFREQUENCY-PHOTONIC SENSOR
SYSTEMS AND SENSING METHODS

(71) Applicants: ARIZONA BOARD OF REGENTS
OF THE UNIVERSITY OF
ARIZONA, Tucson, AZ (US);
GENERAL DYNAMICS MISSION
SYSTEMS, INC., Fairfax, VA (US)

(72) Inventors: Zheshe Zhang, Tucson, AZ (US);
Quntao Zhuang, Tucson, AZ (US);
William Clark, Scottsdale, AZ (US)

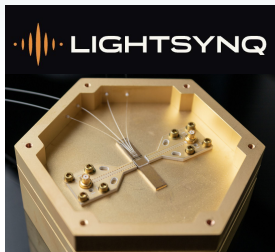
(19) **United States**
(12) **Patent Application Publication**
Bash et al.

(54) COVERT SENSOR

(71) Applicant: RAYTHEON BBN TECHNOLOGIES
CORP., Cambridge, MA (US)

(72) Inventors: Boulat A. Bash, Winchester, MA (US);
Saikat Guha, Cambridge, MA (US)

Entrepreneurial Culture & Impact



LightSynq Technologies, Inc. is a spin out of Mikhail Lukin's lab (Harvard), that was incubated at AWS before being founding in 2024 and acquired by IonQ in 2025. It specializes in photonic interconnects and quantum memory, essential technologies for quantum internet and scaling quantum computers.



Quantum Network Technologies, Inc. (Qunett), co-founded by Saikat Guha (UMD) and Dirk Englund (MIT) to develop scalable hardware for quantum device connectivity, integrate with existing infrastructure and enable deployable quantum networks ranging from data centers to metro fiber optic networks to satellite-based global communication.

We move qubits.

5 other startups from CQN researchers:

- Diffraction: Advanced Imaging (Guha, UMD)
- Blanqet: Quantum Security (Jiang, UChicago)
- Techyawn: Quantum Security (Raza, UMass)
- Hydroteck: Optical Blood Measure Camacho, BYU)
- Axiomatic-AI: Reasoning in science and engineering (Englund, MIT)

IPP Membership Trend Chart



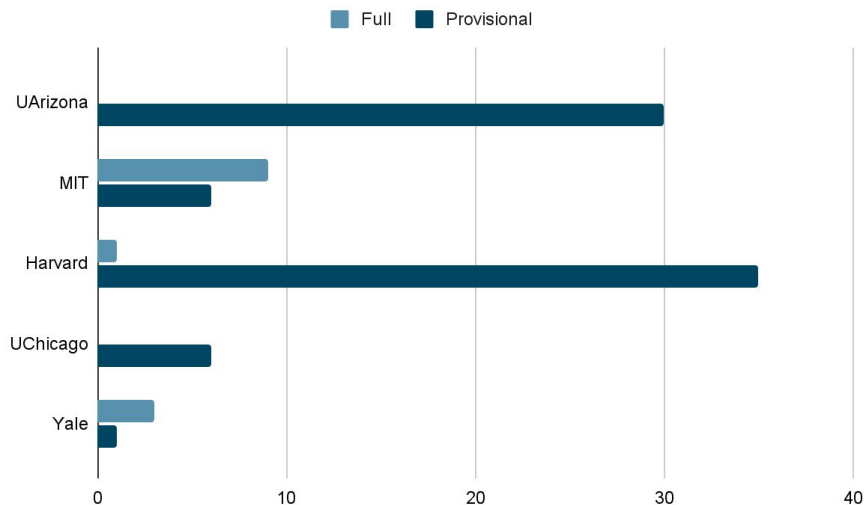
Major Y5 Efforts

- **Churn rate reduced:** Y4 (%18) -> Y5(%5)
- **First technical IPP project launched:** Digital-Twin testbed (QuantumSavory)
- **Deeper member engagement:** Interaction among IAB members and CQN PIs
- **Broader community building:** Major collaboration with Quantum Economic Development Consortium (QED-C) on Quantum Network Application Roadmap (QNAR) project

IP and Technology Transfer

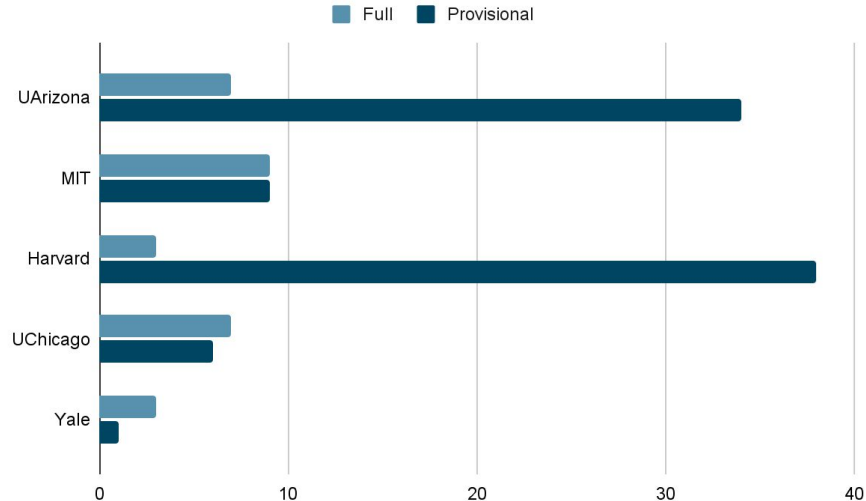
Y1-4

91 Patents: 13 Full + 78 Provisional



Y1-5

117 Patents: 29 Full + 88 Provisional





QN Applications Roadmap 2.0

Organizing committee

September 2024

Congress hearing

May 2025



Celia Merzbacher



CQN-NSF-QEDC organized QNAR2.0 workshop, July 2025

Workshop

July 2025



Mark Mortensen
Telco Market Analyst

Surveys Ready

October 2025

Report Ready

December 2025

IPP fund use

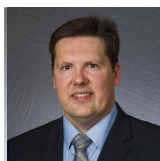


Industry Advisory Board

Chair



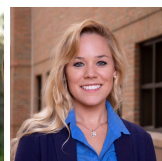
Timothy Burt
L3Harris
Scientist, Quantum Solutions



Joe Buck
Lockheed Martin
Technical Fellow



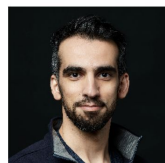
Samuel Knarr
L3 Harris
*Optical Engineer,
Quantum Solutions*



Laura Andre
Qunett
CEO



Zac Dutton
Raytheon BBN
*Lead Scientist, Physical
Sciences & Systems*



Mehdi Namazi
Qunnett
Founder and CSO



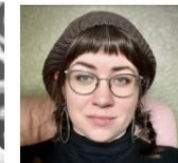
Peng Zhao
Cisco Systems
Quantum Research Scientist



Reza Nejabati
Cisco Systems
Head of Quantum Research



William Clark
Inflection
*VP Quantum Development
Solutions*



Alex Tingle
Inflection
Technical Product Manager

2 VPs
1 Fellow
1 CEO
1 CSO

**Quarterly
Meetings**

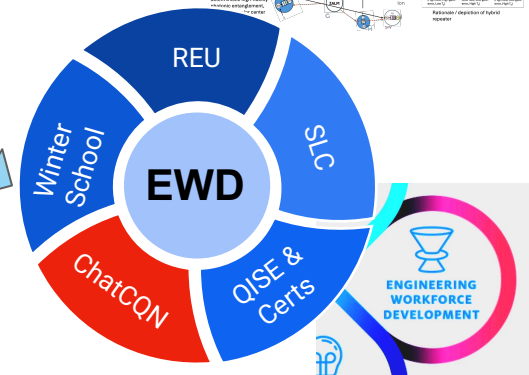
**1-1
meetings**

[illegible]

Intellectual Property

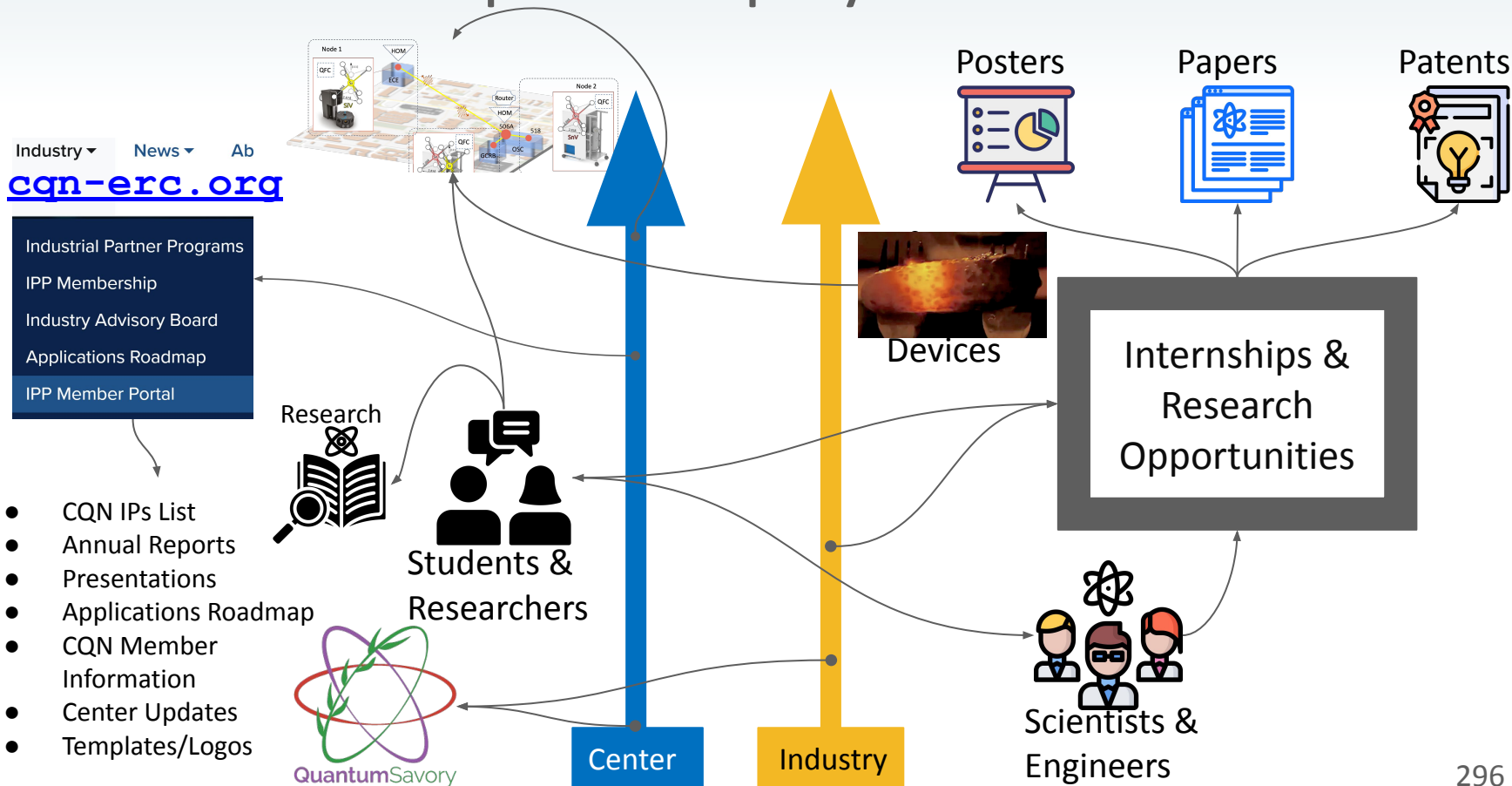
Research,
talent, and
internships

The Center and Industry have built broad interactions to be continued and expanded through deliberate effort and effective, timely communication.

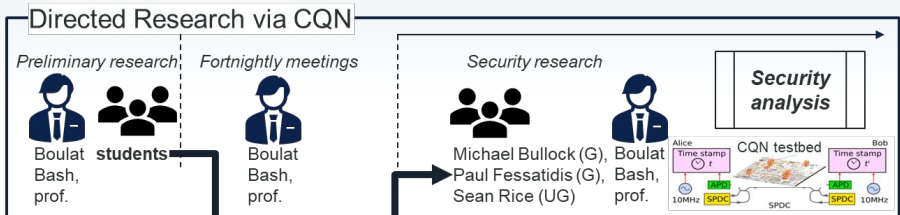


Industry ▾ News ▾ Ab

cqn-erc.org



Illustrative Case Study



IRAD & Program
2023—2025

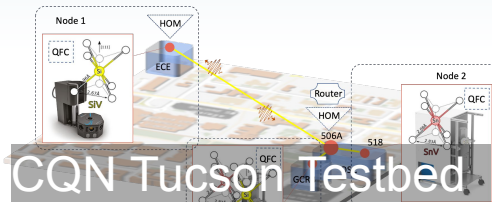
Michael Bullock, intern

Spread Photon Transceiver for Quantum Secure Communications

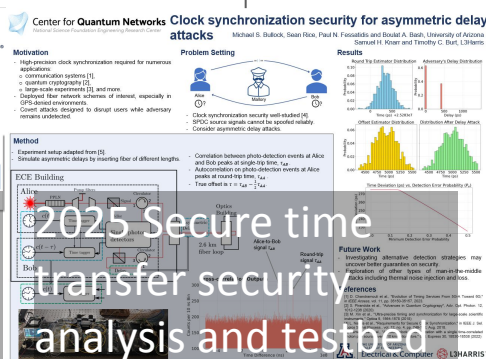
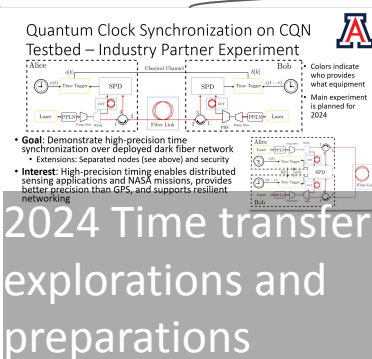
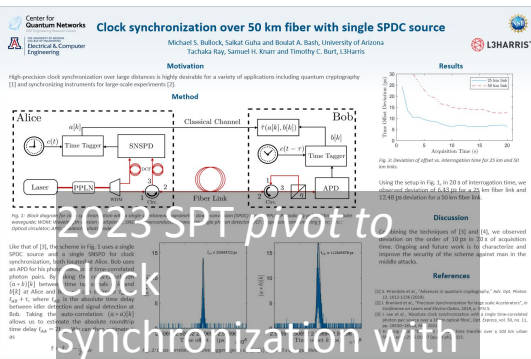
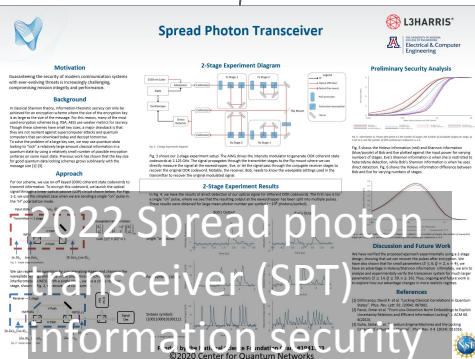
Publisher: IEEE

Wesley Webb, Michael S. Bullock, Samuel H. Knorr, Timothy C. Burt, Jim A. Drake, Saikat Guha, All Authors

2023 IEEE MILCOM
Conference paper



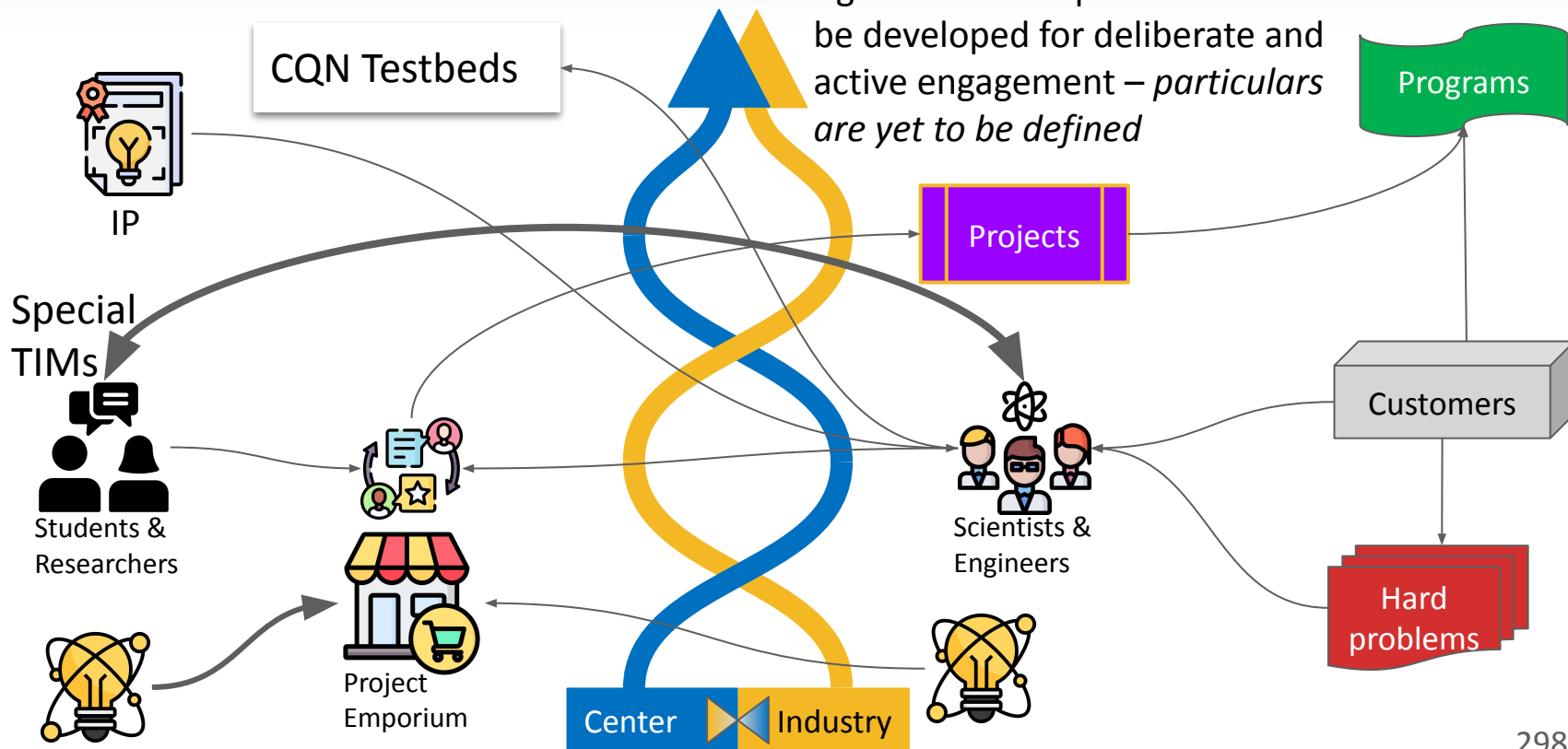
2025 patent
19/089,055





Cultivate Intertwining for Sustainability

Agreement that processes should be developed for deliberate and active engagement – *particulars are yet to be defined*





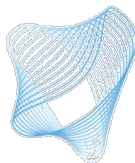
Building Toward Year 11 Transition

- Graduate into an IUCRC; keys to IUCRC success:
 - Strong & Active IAB & leadership that bridges cultural divide 
 - Sizeable paying membership base (need ~50% growth)
 - High-Impact, Pre-Competitive Research (make more industry-led)
 - Robust Workforce Development Program (WFD transition metrics as industry grows)
- Phase 2 IPP Priorities:
 - Enhance relationship management & research development for retention, growth & impact
 - Expand programs to systematically build collaborative research, experiential learning & transition

Leverage UMD's Ecosystem

MID-ATLANTIC **QUANTUM** ALLIANCE

- Quantum Leap Career Nexus
- Suppliers
- Co-Design Workshops
- DC-QNet
- Quantum World Congress
- Industry Challenges



**Center for
Quantum Networks**
NSF Engineering Research Center

QLab
NATIONAL QUANTUM
LABORATORY



 LIGHTSYNQ

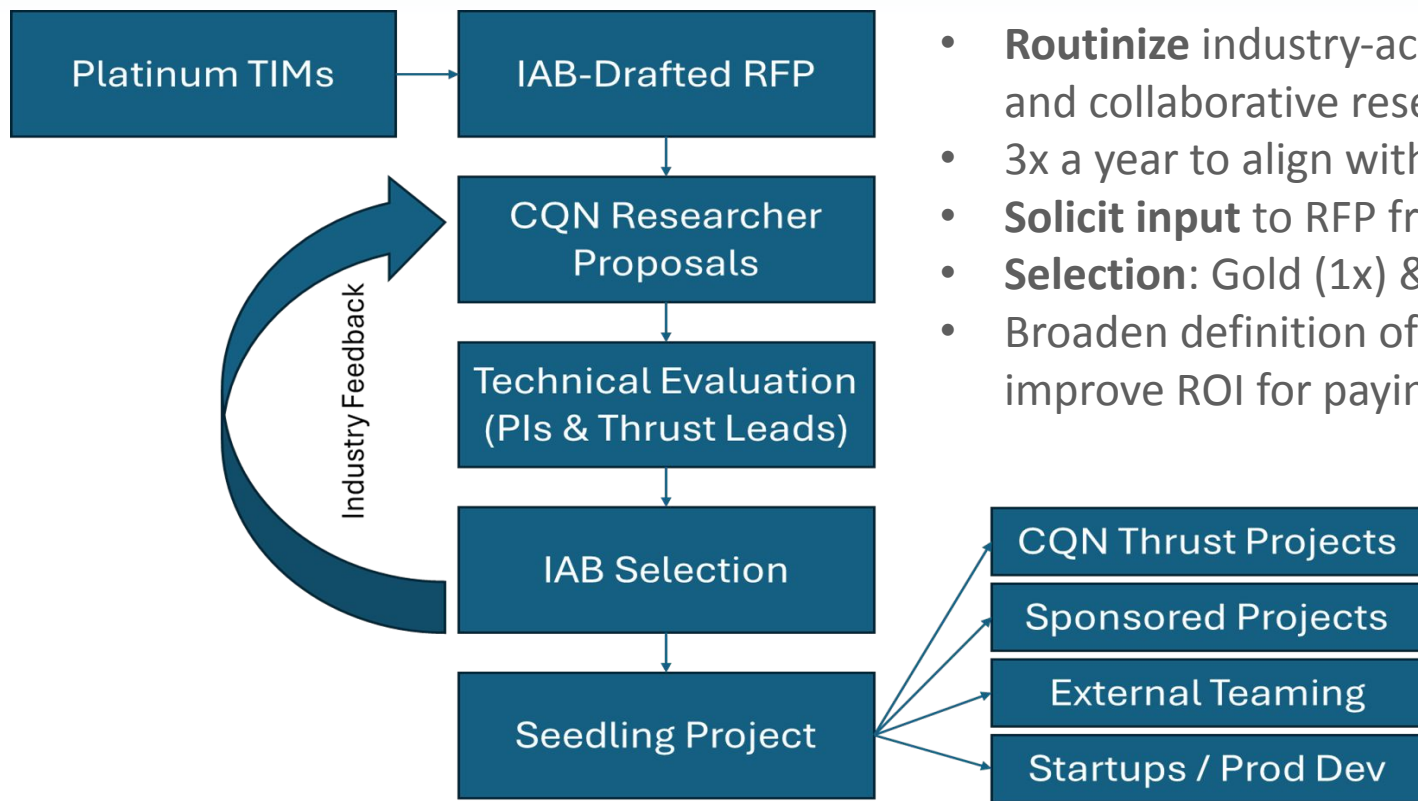


**QUANTUM
STARTUP FOUNDRY**



Capital Quantum
Benchmarking Hub

Updated Custom Research Program



- **Routinize** industry-academia interaction and collaborative research
- 3x a year to align with academic calendar
- **Solicit input** to RFP from all IAB members
- **Selection:** Gold (1x) & Platinum (2x) votes
- Broaden definition of transition **success** & improve ROI for paying members



Enhancing Entrepreneurship

- Build on CQN's strong history of spin-outs
- Develop & aggressively recruit new Bronze “Investor” category
 - VCs & Incubators (\$5k/in-kind)
- Joint programming with Investor members, I-Corps, etc.
 - Customer discovery
 - Pitch training & competitions
 - Business model development & coaching
- “Meet the Inventor” webinar series
 - Accelerate awareness of new IP & core inventor teams
 - Diamond can participate live; time-delays for release to Gold and beyond



Growing an Engaged Community

Lower barriers to entry

- Software to expand virtual testbed
- Validation, beta-testing and co-design with hardware providers and enabling technology providers

Deliver value for all members, but make ROI of higher tier membership enticing

Market successes to retain & enhance recruitment of new members

