CONFERENCE PROGRAM

12–16 OCT. 2020

IEEE QUANTUM WEEK

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Our mission has always been to make quantum computing available to everyone.

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IEEE QUANTUM WEEK

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Welcome!

IEEE Quantum Week is a multidisciplinary quantum computing venue where attendees have the unique opportunity to discuss challenges and opportunities with quantum researchers, scientists, engineers, entrepreneurs, developers, students, practitioners, educators, programmers, and newcomers.

Have a great week at IEEE Quantum Week 2020!

IEEE Quantum Week — Chairs Message

Welcome to the inaugural *IEEE International Conference on Quantum Computing and Engineering (QCE20)* or *IEEE Quantum Week*. We are thrilled to report that with your outstanding contributions and participation, we have built a premier meeting to grow the highly interdisciplinary quantum community and help advance quantum computing, engineering, and technology. One of the goals for IEEE Quantum Week, developed under the auspices of IEEE Future Directions Quantum Initiative, is to build a first-class meeting of quantum minds providing ample opportunities to network with peers and explore partnerships among industry, government, and academia. IEEE Quantum Initiative officially started in January 2019 under the leadership of the following four co-chairs: Candace Culhane, Los Alamos National Laboratory, Erik DeBenedictis, Sandia National Laboratories, Travis Humble, Oak Ridge National Laboratory, and Hausi Müller, University of Victoria along with Terence Martinez, Program Director, IEEE Future Directions.

We wish you and your loved ones all the best in these difficult times. Our thoughts are with those of you who may be unwell, anxious, or grieving due to the COVID-19 pandemic that is reshaping our lives. Due to this situation, QCE20 cannot be held in Broomfield-Denver, Colorado as originally planned. Thus, QCE20 is held as a fully virtual and digital event during the week of 12–16 October 2020 with on-demand access to all the QCE20 sessions past the conference week until 30 November 2020.

With the outstanding contributions from the international quantum community, we formed an exceptional program that spans quantum science and engineering—from qubit and control technologies, to quantum software infrastructure and development platforms, to the highly anticipated realm of promising quantum applications. The synergistic IEEE Quantum Week aims to bring together different skill sets to generate synergies among quantum professionals, researchers, educators, entrepreneurs, champions and enthusiasts exchanging and sharing their experiences, challenges, research results, innovations, applications, pathways and enthusiasm on all aspects of quantum computing, engineering and technologies. Hardware-software co-design is an important theme in the quantum communities. Thus, bringing together researchers and practitioners from quantum information science and algorithms, quantum technologies, the spectrum of hardware and software platforms, software and systems engineering, as well as promising applications domains will foster partnerships, alliances, and start-ups.

QCE20 features nine parallel tracks over five days comprising 10 keynotes by world-class speakers, 16 workforce-building tutorials, 21 community-building workshops, 49 technical paper presentations, 7 stimulating panels, 30 innovative posters, thought-provoking Birds of Feather (BoF) sessions, and virtual rooms to network and relax in the Colorado Rockies. In its virtual exhibits, IEEE Quantum Week highlights technologies as well as R&D opportunities by established quantum companies and start-ups as well as quantum research labs and institutes.

While one week is not enough to explore the 270+ hours of quantum computing and engineering programming offered by IEEE Quantum Week, participants can access quantum week sessions at their leisure over seven weeks until the end of November. Moreover, different cohorts will be attracted to different program tracks. For example, quantum newcomers will be best served by the stellar keynotes, tutorials, panels, and BoFs. Experienced quantum researchers, engineers and developers will find workshops, technical papers, and posters in their subject area. The QCE20 Exhibitors, Patrons, and Supporters will showcase their technologies and discuss training and R&D opportunities. Entrepreneurs can get to know the founders of quantum start-ups and learn how to build and fund a start-up in the Exhibits as well as the Quantum Entrepreneurship workshop.

As the quantum realm is highly interdisciplinary spanning many scientific and engineering fields and application areas, one of the key ideas was to enlist the IEEE organizational units in the quantum space as financial and technical sponsors. IEEE Quantum Week 2020 is financially co-sponsored by IEEE Quantum Initiative, IEEE Computer Society (IEEE CS), IEEE Communications Society (ComSoc), IEEE Photonics Society, and IEEE Council on Superconductivity (CSC) as well as technically co-sponsored by IEEE Technology & Engineering Management Society (TEMS) and IEEE Electronics Packaging Society (EPS).

A terrific team orchestrated IEEE Quantum Week 2020—originally planned as an in-person event in Broomfield, Colorado—which transitioned to an all-virtual event due to the COVID-19 pandemic. We are deeply indebted to very many volunteers and IEEE staff for their help and support in orchestrating QCE20. First, we would like to thank all the contributors—the keynote speakers, the technical paper and poster authors, the panel organizers and panelists, the tutorial presenters, the workshop and BoF organizers. We especially would like to thank the exhibitors, the Platinum, Gold, Silver, Bronze sponsors and patrons, and the supporters for their financial, technical, and in-kind contributions. Second, we would like to thank all attendees who registered for QCE20. Your enthusiasm and appreciation of the speakers and the program made it all worthwhile. Third, we would like to recognize all the committee members and IEEE staff (cf. QCE20 conference proceedings) who worked tirelessly in seeing IEEE Quantum Week come to fruition.

We hope that the virtual QCE20 live and on-demand experience will be a great success. We sincerely hope that you will enjoy IEEE Quantum Week 2020 and find plenty of time to explore and experience the many wonderful contributions we received from the international quantum community.

Please stay safe.

Hausi Müller
QCE20 General Chair
Co-Chair IEEE Quantum Initiative
University of Victoria

Greg Byrd
QCE20 Technical Program Board Chair
NC State University

Candace Culhane
QCE20 Finance & Exhibits Chair
Co-Chair IEEE Quantum Initiative
Los Alamos National Laboratory

Erik DeBenedictis
QCE20 Panel Chair
Co-Chair IEEE Quantum Initiative
Zettaflops LLC

Travis Humble
QCE20 Workshops Co-Chair
Co-Chair IEEE Quantum Initiative
Oak Ridge National Laboratory

IEEE QUANTUM WEEK

Thank You to Our Sponsors!

With your support, we are pleased to present the all-virtual inaugural IEEE International Conference on Quantum Computing and Engineering (QCE20), a multidisciplinary event focusing on quantum technology, research, development, and training.

We are grateful to our amazing lineup of sponsors for being a part of Quantum Week.

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IEEE Entrepreneurship

acm ACM Transactions on Quantum Computing

IEEE QUANTUM WEEK

Sponsor Event Highlights

Mon, 12 October

Mountain Time (UTC-6)	Mon Event	Company
12:15 PM JOIN →	DEMONSTRATION **Albert - Cloud BEC**	ColdQuanta
12:30 PM JOIN →	INFORMATION SESSION **Xanadu Quantum Cloud & Photonic Quantum Computers**	Xanadu Quantum Technologies
1:30 PM JOIN →	PRESENTATION AND DEMONSTRATION **Improving the performance of IBMQ quantum computer hardware with quantum control**	Q-CTRL
2:00 PM JOIN →	PRESENTATION **Improving the performance of IBMQ quantum computer hardware with quantum control**	Q-CTRL
2:30 PM JOIN →	PRESENTATION - LIVE **IBM Q Hub at NC State First Univ. QHub in America**	NC State Univ.

Tue, 13 October

Mountain Time (UTC-6)	Tue Event	Company
10:00 AM JOIN →	DEMO AND FREE SIGNUP **Be A Quantum Pioneer Create BECs with Albert**	ColdQuanta
10:00 AM JOIN →	POWER POINT PRESENTATION **IBM Q Hub at NC State First Univ. QHub in America**	NC State Univ.
12:30 PM JOIN →	INFORMATION SESSION **Partnering with Xanadu**	Xanadu Quantum Technologies
2:30 PM JOIN →	PRESENTATION **Gate space scanning and keeping qubits stable using the QDAC**	QDevil

Wed, 14 October

Mountain Time (UTC-6)	Wed Event	Company
10:00 AM JOIN →	DEMO AND FREE SIGNUP **Be A Quantum Pioneer Create BECs with Albert**	ColdQuanta
12:15 PM JOIN →	VIRTUAL COFFEE BREAK **Talk to our Application Scientists about Your Measurement Challenges**	Zurich Instruments

Thu, 15 October

Mountain Time (UTC-6)	Wed Event	Company
10:00 AM JOIN →	VIRTUAL COFFEE BREAK **Talk to our Application Scientists about Your Measurement Challenges**	Zurich Instruments
2:30 PM JOIN →	DEMONSTRATION **Ultracold Atom Based Quantum Sensors; Quantum Computing with Rydberg Atoms; Quantum Computing with Trapped Ions; Trapped Ions; Ultracold Atoms; Quantum Sensors**	ColdQuanta
2:30 PM JOIN →	PRESENTATION **Noise, filtering and proper grounding at milli-Kelvin from DC to GHz**	QDevil

General Conference Information

Best Practices for Attending a Virtual Conference

1. Prioritize your time, engage in sessions and presentations, and use the chat or other networking tools to engage with attendees, presenters, and exhibitors.
2. Schedule sessions, presentations, exhibition time, and networking opportunities on your calendar. This will allow you dedicated time to engage with every element of the program.
3. Minimize distractions: When you're watching alone; it's easy to multi-task and get distracted. Instead, try to reduce interruptions, avoid double booking yourself with other meetings or priorities—this will allow for a better attendee experience.
4. If you miss a session no fear, all content will be available on demand until 30 November 2020.

Additional Information available on Hubb website.

Supported Browsers

Registration

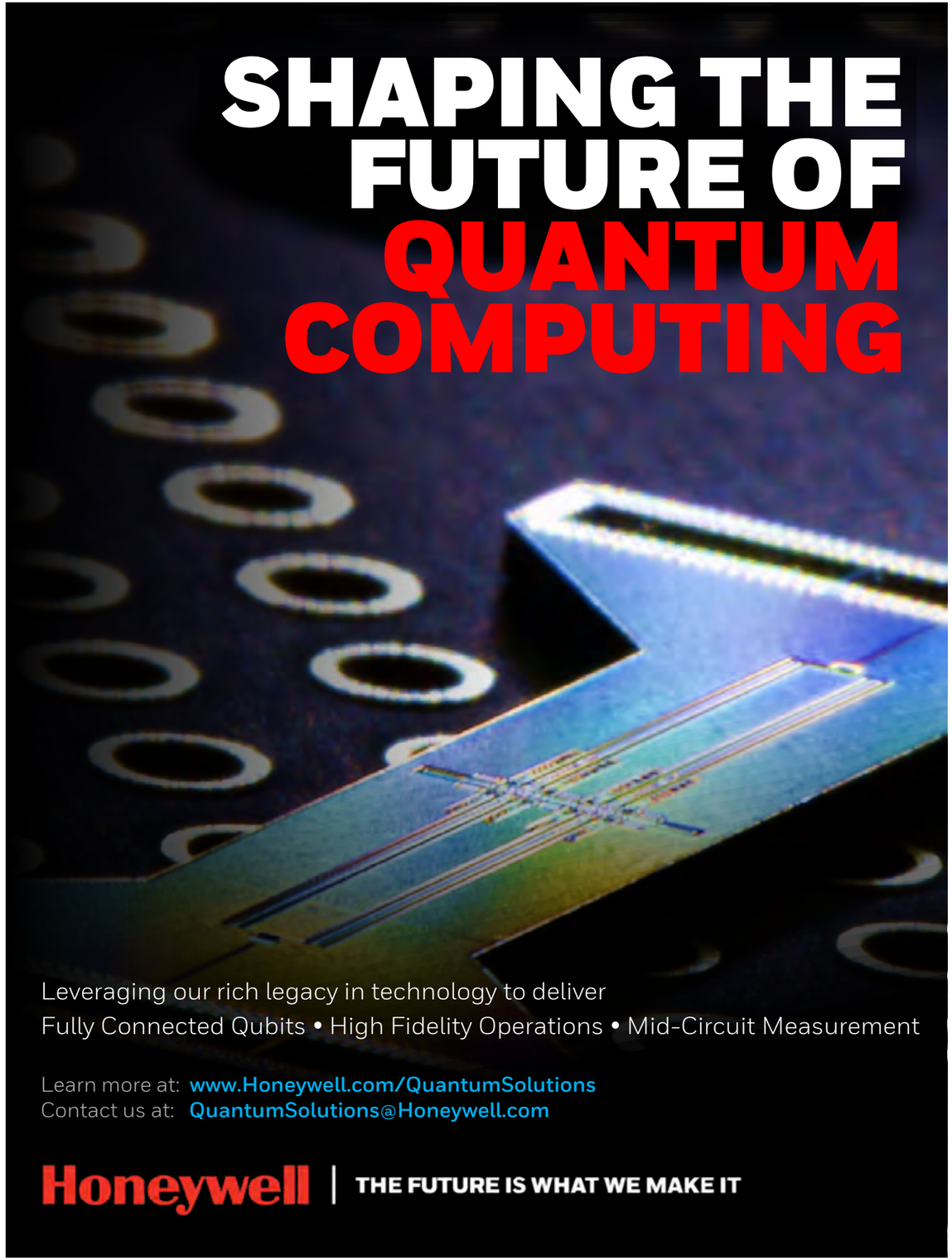
IEEE QUANTUM WEEK

Uniform Daily Schedule

Mountain Time (UTC-6)	Sessions
8:30–10:00	Session 1: Keynote, Awards, Announcements
10:00–10:45	Session 2: Exhibits, Posters, BoFs, Networking
10:45–12:15	Session 3: Papers & Panels, Tutorials, Workshops
12:15–13:00	Session 4: Exhibits, Posters, BoFs, Networking
13:00–14:30	Session 5: Papers & Panels, Tutorials, Workshops
14:30–15:15	Session 6: Exhibits, Posters, BoFs, Networking
15:15–16:45	Session 7: Papers & Panels, Tutorials, Workshops
16:45–17:30	Session 8: Exhibits, Posters, BoFs, Networking
17:30–19:00	Session 9: Keynote, Awards, Announcements
19:00–19:45	Session 10: Exhibits, Posters, BoFs, Networking

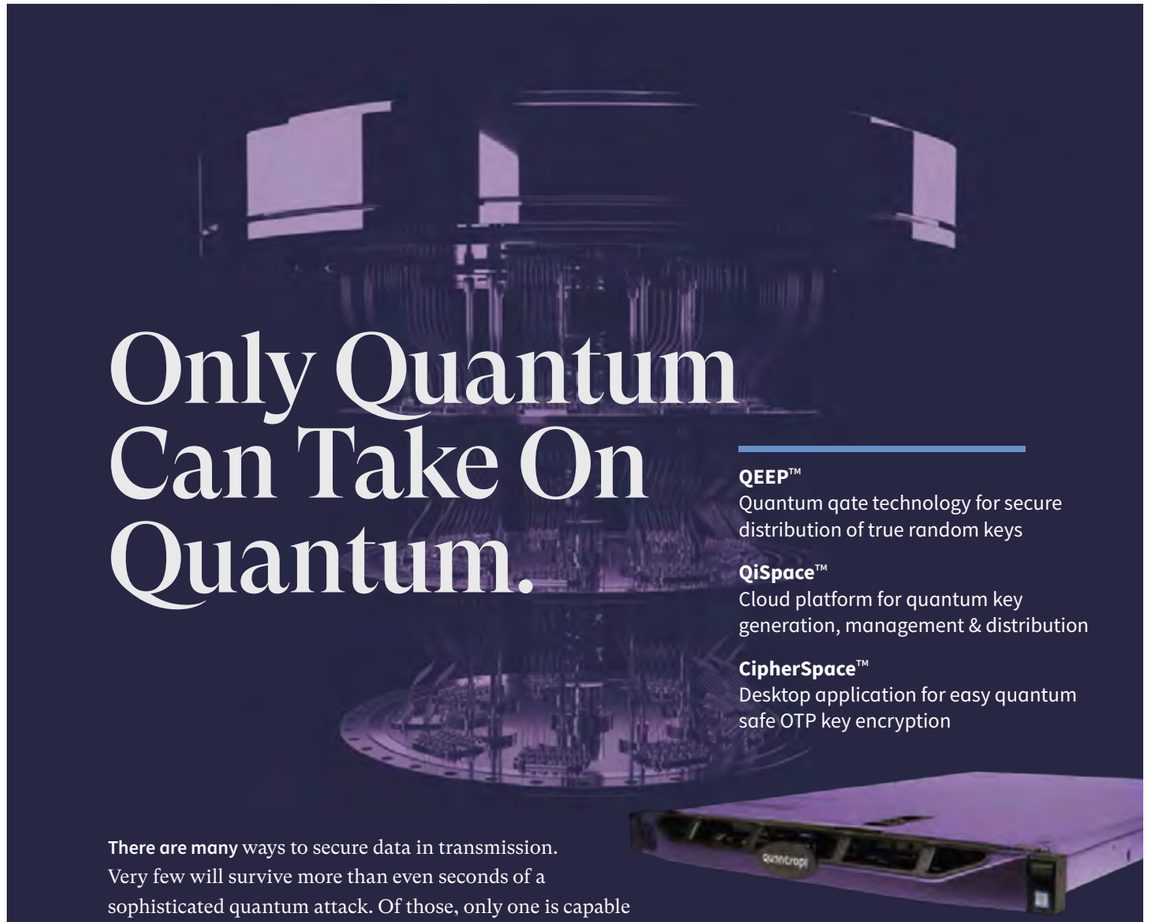
Program Legend

- BoF (Birds of a Feather)
- Colorado / Breaks
- Exhibits
- Keynotes
- Networking
- Onboard
- Panels
- Papers
- Posters
- Tutorials
- Workshops



QCE2020 — Program at a Glance

Mountain Time (UTC-6)	Mon, 12 October	Tue, 13 October
8:30–10:00	KEYNOTE: Jerry Chow, IBM Quantum	KEYNOTE: Patty Lee, Honeywell Quantum Solutions
10:00–10:45	Exhibits: Bluefors, QM, Pasqal Posters 1 Open BoF Networking Colorado	Exhibits: Keysight, Toptica, Elyah, Oxford-Inst Posters 3 IEEE CSC BoF Networking Colorado
10:45–12:15	QIA-1 Papers Tutorials Workshops Panels	QCSC-1 Papers Tutorials Workshops QASN-1 Papers
12:15–13:00	Exhibits: IBM, ColdQuanta, QDevil, IEEE-TQE Posters 2 Create QC BoF Networking Colorado	Exhibits: Honeywell, Q-CTRL, IQM, EeroQ Posters 4 Open BoF Networking Colorado
13:00–14:30	QIA-2 Papers Tutorials Workshops Panels	QCSC-2 Papers Tutorials Workshops QASN-2 Papers
14:30–15:15	Exhibits: Honeywell, NC-State, CMC, ACM-TQC Open Posters Open BoF Networking Colorado	Exhibits: Microsoft, Xanadu, SeeQC Posters 5 Open BoF Networking Colorado
15:15–16:45	QIA-3 Papers Tutorials Workshops QENG Papers	QCSC-3 Papers Tutorials Workshops
16:45–17:30	Exhibits: Quantropi, Intel Labs Open BoF Open Networking Colorado	Exhibits: IBM, Zapata Posters 6 Open BoF Open Networking Colorado
17:30–19:00	KEYNOTE: Michelle Simmons, UNSW Australia	KEYNOTE: Yu Chen, Google AI Quantum
19:00–19:45	Open Exhibits Open Posters Open BoF Open Networking	Open Exhibits Open Posters Open BoF Open Networking



There are many ways to secure data in transmission. Very few will survive more than even seconds of a sophisticated quantum attack. Of those, only one is capable of functioning outside the laboratory—right here in the real world, over unlimited distances—on today's existing fiber, or even wireless Internet.

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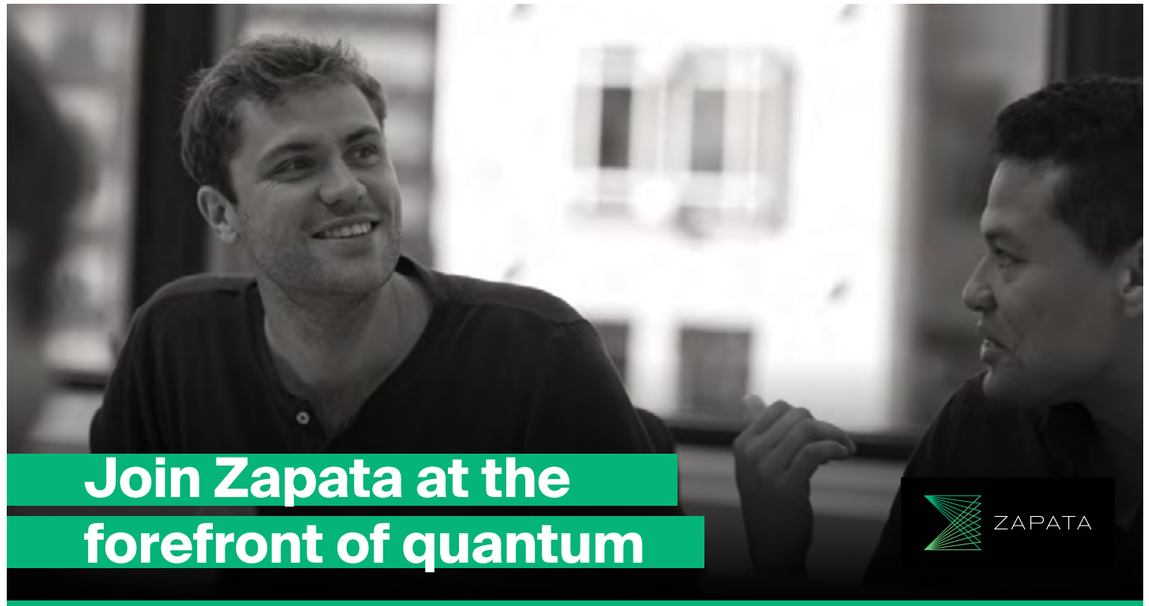
QCE2020 — Program at a Glance (continued)

Mountain Time (UTC-6)	Wed, 14 October	Thu, 15 October	Fri, 16 October
8:30–10:00	KEYNOTE: Krysta Svore, Microsoft Quantum	KEYNOTE: Alán Aspuru-Guzik, Univ. of Toronto	KEYNOTE: Jake Taylor, NIST, QuIS, JQI
10:00–10:45	Exhibits: IQM, Netlabs, Delft-Circuits, Oxford-Inst Posters 7 Open BoF Networking Colorado	Exhibits: CMC, Q-CTRL, Bluefors, Zurich-Inst Posters 10 Open BoF Networking Colorado	Exhibits: IBM, NC-State, QDevil Posters 12 Open BoF Networking Colorado
10:45–12:15	QC-1 Papers Tutorials Workshops QCSC-4 Papers	QEDU Papers Tutorials Workshops QC-4 Papers	QBM-1 Papers Tutorials Workshops
12:15–13:00	Exhibits: Microsoft, QM, Toptica, Zurich-Inst Posters 8 HE Physics BoF Networking Colorado	Exhibits: Zapata, Intel Labs, Pasqal, ACM-TQC Posters 11 QIS at Argonne BoF Networking Colorado	Exhibits: Microsoft, Keysight Posters 13 Quantum Science Centers BoF Networking Colorado
13:00–14:30	QC-2 Papers Tutorials Workshops Panels	QC-5 Papers Tutorials Workshops Panels	QBM-2 Papers Tutorials Workshops
14:30–15:15	Exhibits: IBM, Zapata, Aliro Posters 9 Open BoF Networking Colorado	Exhibits: Quantropi, ColdQuanta, IEEE-TQE Open Posters QEDU BoF Networking	Exhibits: Honeywell, Quantropi Open Posters Open BoF Networking Colorado
15:15–16:45	QC-3 Papers Tutorials Workshops Panels	QC-6 Papers Tutorials Workshops Panels	Tutorials Workshops Panels
16:45–17:30	Exhibits: Honeywell, Xanadu Open BoFs Open Networking Colorado	Exhibits: Microsoft, Aliro Open BoFs Open Networking Colorado	Open Exhibits Open BoFs Open Networking Colorado
17:30–19:00	KEYNOTE: Kae Nemoto, NII QIS Japan	KEYNOTE: Anne Matsuura, Intel Labs	KEYNOTE: Alexander Condello, D-Wave Systems
19:00–19:45	Open Exhibits Open Posters Open BoFs Open Networking	Open Exhibits Open Posters Open BoFs Open Networking	Open Exhibits Open Posters Open BoFs Open Networking



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QCE20 Program — Mon, 12 October

MT (UTC-6)	Session Name	Session Type	Session Room	Mon Sessions
08:00–19:45	Mon-ONB-10	Onboard	Discover1	QCE20 Welcome, Onboarding & Quote of the Day
08:00–19:45	Mon-OVE-10	Onboard	Discover2	QCE20 Daily Sessions Overview & Announcements
08:30–10:00	Mon-KEY-11	Keynote	Eagle	Announcements, Awards, Keynote: Jerry Chow, IBM Quantum, USA—Quantum Circuits: Rocket Fuel for the Future of Quantum Hardware. Session Chair: Hausi Müller, Univ. of Victoria
10:00–10:45	Mon-KEY-12	Network	Eagle	Hang out with Keynote Speaker Jerry Chow
10:00–10:45	Mon-EB-LU-12	Exhibit	Bluefors	Bluefors — Scheduled Exhibits
10:00–10:45	Mon-EQM-12	Exhibit	QM	Quantum Machines (QM) — Scheduled Exhibits
10:00–10:45	Mon-EP-AS-12	Exhibit	Pasqal	Pasqal — Scheduled Exhibits
10:00–10:45	Mon-POS-12	Posters	Bison	Quantum Information Science Tools — Session Chair: Andreas Bergen, engageLively Pos1: Milan Williams, Elisa Zhao Hang, Adinawa Adjagbodjou, Robert Krueger and Johanna Beyer: QuVis: A Quantum Circuit Visualization Tool for Novices Pos2: Alena Mastiukova, Evgeniy Kiktenko, Aleksey Fedorov: Suppressing decoherence in quantum systems with unitary operations
10:00–10:45	Mon-BOF-12	BoF	Hawk	Scheduled BoF Session
10:00–10:45	Mon-NW1-12	Network	WiseOwl1	Networking Session — Meet Quantum Newcomers
10:00–10:45	Mon-NW2-12	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
10:00–10:45	Mon-COL-12	Break	Rockies	Relax in Beautiful Colorado
10:45–11:15	Mon-QIA1-13	Paper	Bighorn1	Quantum Information & Algorithms 1 (QIA1) — Paper Session Chair: Ojas Parekh, Sandia National Laboratory QIA1: Ewout van den Berg, IBM T.J. Watson Research Center. Quantum phase estimation with optimized sample complexity
11:15–11:45	Mon-QIA1-13	Paper	Bighorn1	QIA1: Hiroshi Yano, Yudai Suzuki, Rudy Raymond, Naoki Yamamoto Keio Univ. and IBM Research Tokyo. Efficient discrete feature encoding for variational quantum classifier
11:45–12:15	Mon-QIA1-13	Paper	Bighorn1	QIA1: William Cappelletti, Rebecca Erbanni, Joaquín Keller, Entropica Labs, Singapore. Polyadic quantum classifier
10:45–11:45	Mon-PAN-13	Panel	Moose	Building a Fault-Tolerant Quantum Computer from the Ground Up. Organizers/Panelists: Sivan, Quantum Machines; Biercuk, Q-CTRL; Peronnin, Alice&Bob. Session Chair: William Tonti, IEEE Future Directions.
10:45–12:15	Mon-TUT-13	Tutorial	Bear1	Part 1: Introduction to Quantum Computing—Pakin: Los Alamos National Laboratory; Rieffel, NASA Ames. Session Chair: Candace Culhane, Los Alamos National Laboratory (LANL)
10:45–12:15	Mon-TUT-13	Tutorial	Bear2	Part 1: Quantum Programming: An Introduction—Asfaw, IBM Quantum. Session Chair: Scott Koziol, Baylor Univ.
10:45–12:15	Mon-TUT-13	Tutorial	Bear3	Part 1: Hands-on Simulation of a Quantum Network—Van Meter, Satoh, Keio Univ. Session Chair: Bruce Kraemer, IEEE Quantum — Initiative

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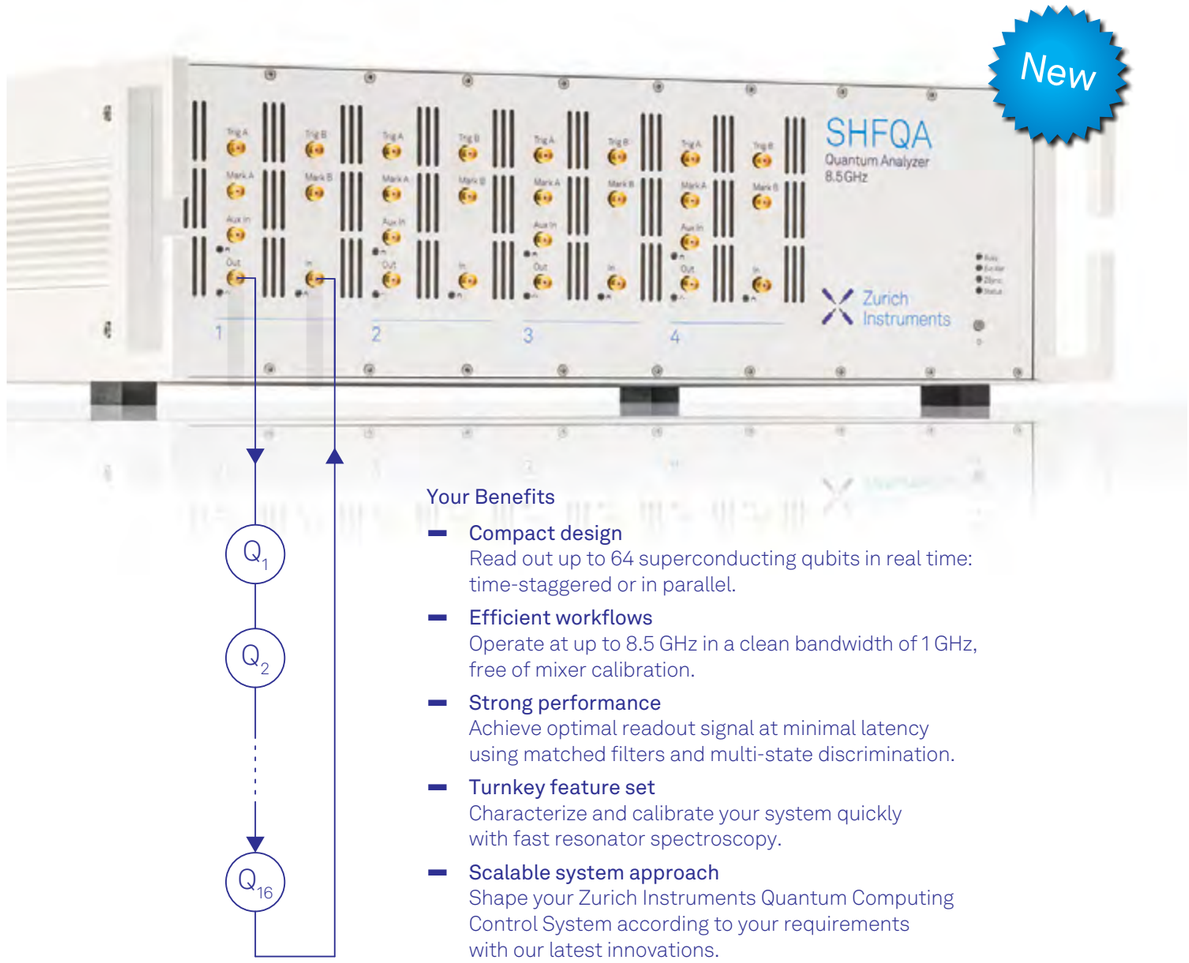

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MT (UTC-6)	Session Name	Session Type	Session Room	Mon Sessions
10:45–12:15	Mon-WKS-13	Workshop	Elk1	Part 1: Software for Quantum Applications, Algorithms, and Workflows—Scholten: IBM Quantum; Greenberg: Facebook AI. Session Chair: Hausi Müller, Univ. of Victoria
10:45–12:15	Mon-WKS-13	Workshop	Elk2	Part 1: Semiconductor-Inspired Engineering for Quantum Computing—Mohiyaddin, Radu: imec, Belgium. Session Chair: Erik DeBenedictis, Zettaflops LLC Laboratory (ORNL)
10:45–12:15	Mon-WKS-13	Workshop	Elk3	Part 1: Applied Quantum Artificial Intelligence—Hamilton, Date: Oak Ridge National Laboratory (ORNL). Session Chair: Travis Humble, Oak Ridge National Laboratory (ORNL)
10:45–12:15	Mon-WKS-13	Workshop	Elk4	Part 1: From Qubits to Quantum Teleportation: A Hands-On Experience for High Schoolers—Angara, Stege, MacLean: Univ. of Victoria; Markham, Knodel: Honeywell Quantum Solutions; Genco: NTIA Session Chair: Ulrike Stege, Univ. of Victoria
12:15–13:00	Mon-EIBM-14	Exhibit	IBM	IBM Quantum — Scheduled Exhibits
12:15–13:00	Mon-ECOQ-14	Exhibit	ColdQuanta	ColdQuanta — Scheduled Exhibits
12:15–13:00	Mon-EQDE-14	Exhibit	QDevil	QDevil — Scheduled Exhibits
12:15–13:00	Mon-ETQE-14	Exhibit	IEEE-TQE	IEEE TQE — Scheduled Exhibits
12:15–13:00	Mon-POS-14	Posters	Bison	Practical Quantum Computing & Applications — Poster Session Chair: Andreas Bergen: engageLivelyPos1: James Cruise, Neil Gillespie and Brendan Reid: Practical Quantum Computing: The value of local computation Pos2: Saasha Joshi: Defence Applications of Quantum Computing
12:15–13:00	Mon-BOF-14	BoF	Hawk	British Columbia NSERC CREATE on Quantum Computing BoF
12:15–13:00	Mon-NW1-14	Network	WiseOwl1	Networking Session — Meet Quantum Newcomers
12:15–13:00	Mon-NW2-14	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
12:15–13:00	Mon-COL-14	Break	Rockies	Relax in Beautiful Colorado — Hike the Rockies
13:00–13:30	Mon-QIA2-15	Paper	Bighorn1	Quantum Information & Algorithms 2 (QIA) — Paper Session Chair: Lukasz Cincio, Los Alamos National Laboratory (LANL) QIA2: Julien Gacon, Christa Zoufal and Stefan Woerner, IBM Research Zürich and ETH Zürich. Quantum-enhanced simulation-based optimization
13:30–14:00	Mon-QIA2-15	Paper	Bighorn1	QIA2: Zsolt Tabi, Ericsson Hungary and Eötvös Loránd Univ.; Kareem H. El-Safty, Wigner Research Centre for Physics; Zsófia Kallus, Ericsson Research Budapest; Péter Hága, Ericsson Research Budapest; Tamás Kozsik, Eötvös Loránd Univ.; Adam Glos, Polish Academy of Sciences and Zoltán Zimborás, Wigner Research Centre for Physics and Budapest Univ. of Technology. Quantum optimization for the graph coloring problem with space-efficient embedding
14:00–14:30	Mon-QIA2-15	Paper	Bighorn1	QIA2: Nathan Thompson, James Steck and Elizabeth Behrman, Wichita State Univ. A non-algorithmic approach to programming quantum computers via machine learning
13:00–14:30	Mon-PAN-15	Panel	Moose	Engineering Challenges in Building a Quantum Computer. Organizers: Lee, Markham: Honeywell; Genco: NTIA; Scholten: IBM. Moderator: Curcic, DARPA—Panelists: Chen, Google Quantum AI; Chow, IBM Quantum; Langer, Honeywell; Roetteler, Microsoft Quantum. Session Chair: Tom Markham, Honeywell Quantum Solutions.
13:00–14:30	Mon-TUT-15	Tutorial	Bear1	Part 2: Introduction to Quantum Computing—Pakin: Los Alamos National Laboratory; Rieffel, NASA Ames.

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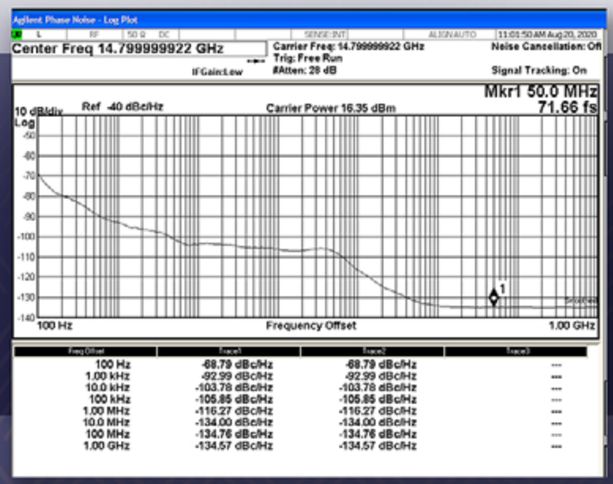

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MT (UTC-6)	Session Name	Session Type	Session Room	Mon Sessions
13:00–14:30	Mon-TUT-15	Tutorial	Bear2	Part 2: Quantum Programming: An Introduction—Asfaw, IBM Quantum.
13:00–14:30	Mon-TUT-15	Tutorial	Bear3	Part 2: Hands-on Simulation of a Quantum Network—Van Meter, Satoh, Keio Univ.
13:00–14:30	Mon-WKS-15	Workshop	Elk1	Part 2: Software for Quantum Applications, Algorithms, and Workflows—Scholten: IBM Quantum; Greenberg: Facebook AI
13:00–14:30	Mon-WKS-15	Workshop	Elk2	Part 2: Semiconductor-Inspired Engineering for Quantum Computing—Mohiyaddin, Radu: imec, Belgium.
13:00–14:30	Mon-WKS-15	Workshop	Elk3	Part 2: Applied Quantum Artificial Intelligence—Hamilton, Date: Oak Ridge National Laboratory (ORNL)
13:00–14:30	Mon-WKS-15	Workshop	Elk4	Part 2: From Qubits to Quantum Teleportation: A Hands-On Experience for High Schoolers—Angara, Stege, MacLean: Univ. of Victoria; Markham, Knodel: Honeywell Quantum Solutions; Genco: NTIA
14:30–15:15	Mon-EH-WE-16	Exhibits	Honeywell	Honeywell Quantum Solutions — Scheduled Exhibits
14:30–15:15	Mon-ENCS-16	Exhibits	NC-State	NC State — Scheduled Exhibits
14:30–15:15	Mon-ETQC-16	Exhibits	CMC	CMC — Scheduled Exhibits
14:30–15:15	Mon-ETQC-16	Exhibits	ACM-TQC	ACM TQC — Scheduled Exhibits
14:30–15:15	Mon-POS-16	Posters	Bison	Open Posters
14:30–15:15	Mon-BOF-16	BoF	Hawk	Scheduled BoF Session
14:30–15:15	Mon-NW1-16	Network	WiseOwl1	Networking Session — Meet Quantum Experts
14:30–15:15	Mon-NW2-16	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
14:30–15:15	Mon-COL-16	Break	Rockies	Relax in Beautiful Colorado — Ski the Rockies
15:15–15:45	Mon-QIA3-17	Paper	Bighorn1	Quantum Information & Algorithms 3 (QIA3) — Paper Session Chair: Stuart Hadfield, NASA Ames QIA3: Andreas Bärtschi and Stephan Eidenbenz. Grover mixers for QAOA, Los Alamos National Laboratory. Shifting complexity from mixer design to state preparation
15:45–16:15	Mon-QIA3-17	Paper	Bighorn1	QIA3: Jeremy Cook, Stephan Eidenbenz and Andreas Bärtschi, Los Alamos National Laboratory. The quantum alternating operator Ansatz on Max-k Vertex Cover
15:15–15:45	Mon-QENG-17	Paper	Bighorn2	Quantum Engineering (QENG) — Paper Session Chair: Luke Govia, Raytheon QENG: Designing high-fidelity multi-qubit gates for semiconductor quantum dots through deep reinforcement learning—Daraeizadeh, Premaratne, Matsuura: Intel Labs
15:45–16:15	Mon-QENG-17	Paper	Bighorn2	QENG: Detection-Based Measurement for Quantum Emulation Devices—Lanham, La Cour: UT Austin
15:15–16:45	Mon-TUT-17	Tutorial	Bear1	Part 3: Introduction to Quantum Computing—Pakin: Los Alamos National Laboratory; Rieffel, NASA Ames.
15:15–16:45	Mon-TUT-17	Tutorial	Bear2	Part 3: Quantum Programming: An Introduction—Asfaw, IBM Quantum.
15:15–16:45	Mon-TUT-17	Tutorial	Bear3	Part 3: Hands-on Simulation of a Quantum Network—Van Meter, Satoh, Keio Univ.
15:15–16:45	Mon-WKS-17	Workshop	Elk1	Part 3: Software for Quantum Applications, Algorithms, and Workflows—Scholten: IBM Quantum; Greenberg: Facebook AI.

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MT (UTC-6)	Session Name	Session Type	Session Room	Mon Sessions
15:15–16:45	Mon-WKS-17	Workshop	Elk2	Part 3: Semiconductor-Inspired Engineering for Quantum Computing—Mohiyaddin, Radu: imec, Belgium.
15:15–16:45	Mon-WKS-17	Workshop	Elk3	Part 3: Applied Quantum Artificial Intelligence—Hamilton, Date: Oak Ridge National Laboratory (ORNL).
15:15–16:45	Mon-WKS-17	Workshop	Elk4	Part 3: From Qubits to Quantum Teleportation: A Hands-On Experience for High Schoolers—Angara, Stege, MacLean: Univ. of Victoria; Markham, Knodel: Honeywell Quantum Solutions; Genco: NTIA
16:45–17:30	Mon-EQUA-18	Exhibits	Quantropi	Quantropi — Scheduled Exibits
16:45–17:30	Mon-EINT-18	Exhibits	IntelLabs	Intel Labs — Scheduled Exibits
16:45–17:30	Mon-POS-18	Posters	Bison	Open Posters
14:30–15:15	Mon-BOF-18	BoF	Hawk	Open BoF Session
16:45–17:30	Mon-NW1-18	Network	WiseOwl1	Networking Session — Meet Quantum Experts
16:45–17:30	Mon-NW2-18	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
16:45–17:30	Mon-COL-18	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature

MT (UTC-6)	Session Name	Session Type	Session Room	Mon Sessions
17:30–19:00	Mon-KEY-19	Keynote	Eagle	Announcements, Awards, Keynote: Michelle Simmons, Founder, Silicon Quantum Computing, Sydney, Australia. Session Chair: Greg Byrd, NC-State Univ. Engineering Qubits in Silicon with Atomic Precision
19:00–19:45	Mon-KEY-20	Network	Eagle	Hang out with Keynote Speaker Michelle Simmons
19:00–19:45	Mon-EX-OP-20	Exhibits	Patrons	Open Exhibits
19:00–19:45	Mon-PO-SO20	Posters	Bison	Open Posters
14:30–15:15	Mon-BOFO-20	BoF	Hawk	Open BoF Session
19:00–19:45	Mon-NW1-20	Network	WiseOwl1	Networking Session — Meet Quantum Experts
19:00–19:45	Mon-NW2-20	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
19:00–19:45	Mon-COL-20	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature

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Director of Quantum & Molecular Technologies
Intel Labs

Oct 12 10:45 — *Designing high-fidelity multi-qubit gates for semiconductor quantum dots through deep reinforcement learning*

Oct 13 13:30 — *Efficient quantum circuits for accurate preparation of smooth, differentiable quantum states*

Oct 13 14:00 — *On connectivity-dependent resource requirements for digital quantum simulation of d-level particles*

Oct 13 15:45 — *Efficient BIKE hardware design with constant-time decoder*

Oct 14 14:30 — *Engineering the cost function of a variational quantum algorithm for implementation on near-term devices*

Oct 15 17:30 — Keynote - Anne Matsuura
Quantum Computing: A Scalable, Systems Approach

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QCE20 Program — Tue, 13 October

MT (UTC-6)	Session Name	Session Type	Session Room	Tue Sessions
08:00–19:45	Tue-ONB-10	Onboard	Discover1	QCE20 Welcome, Onboarding & Quote of the Day
08:00–19:45	Tue-OVE-10	Onboard	Discover2	QCE20 Daily Overview of Sessions & Announcements
08:30–10:00	Tue-KEY-11	Keynote	Eagle	Announcements, Awards, Keynote: Patty Lee, Honeywell Quantum Solutions, USA—High Performance Quantum Computing with Trapped Ions. Session Chair: Travis Humble, Oak Ridge National Laboratory (ORNL)
10:00–10:45	Tue-KEY-12	Network	Eagle	Hang out with Keynote Speaker Patty Lee
10:00–10:45	Tue-EKEY-12	Exhibit	Keysight	Keysight — Scheduled Exhibits
10:00–10:45	Tue-ETOP-12	Exhibit	Toptica	Toptica — Scheduled Exhibits
10:00–10:45	Tue-EELY-12	Exhibit	Elyah	Elyah — Scheduled Exhibits
10:00–10:45	Tue-EOXF-12	Exhibit	Oxford-Inst	Oxford Instruments — Scheduled Exhibits
10:00–10:45	Tue-POS-12	Posters	Bison	Ion Trap Hardware and Software Technologies 1 — Poster Session Chair: Tom Markham, Honeywell Quantum Solutions Pos1: Virginia Frey, Richard Rademacher, Noah Greenberg, Nikolay Videnov, Matthew Day, Crystal Senko and Rajibul Islam: A unified software control system for open-access trapped ion quantum computers Pos2: Richard Rademacher, Virginia Frey, Noah Greenberg, Nikolay Videnov, Matthew Day, Crystal Senko and Rajibul Islam: A unified electronic control system for open-access trapped ion quantum computers
10:00–10:45	Tue-BOF-12	BoF	Hawk	IEEE Council on Superconductivity (CSC) BoF
10:00–10:45	Tue-NW1-12	Network	WiseOwl1	Networking Session — Meet Quantum Newcomers
10:00–10:45	Tue-NW2-12	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
10:00–10:45	Tue-COL-12	Break	Rockies	Relax in Beautiful Colorado
10:45–11:15	Tue-QCSC1-13	Paper	Bighorn1	QCSC1 Session Chair: Lajos Hanzo, University of Southhampton. QCSC1: Patricio Fuentes, Josu Etxezarreta Martinez, Pedro M. Crespo, Tecnun – Univ. of Navarra and Javier Garcia-Frías, Univ. of Delaware. Performance of non-CSS LDGM-based quantum codes over the Misidentified Depolarizing Channel
11:15–11:45	Tue-QCSC1-13	Paper	Bighorn1	QCSC1: Josu Etxezarreta Martinez, Patricio Fuentes, Pedro M. Crespo, Tecnun – Univ. of Navarra and Javier Garcia-Frías, Univ. of Delaware. Pauli channel online estimation protocol for quantum turbo codes

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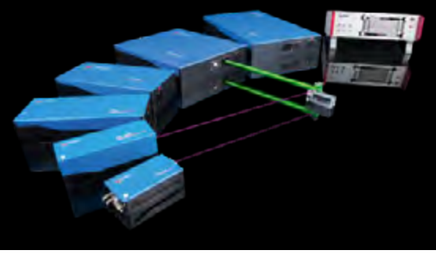

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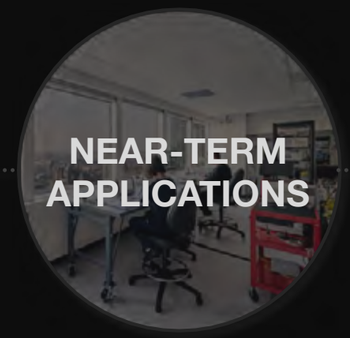

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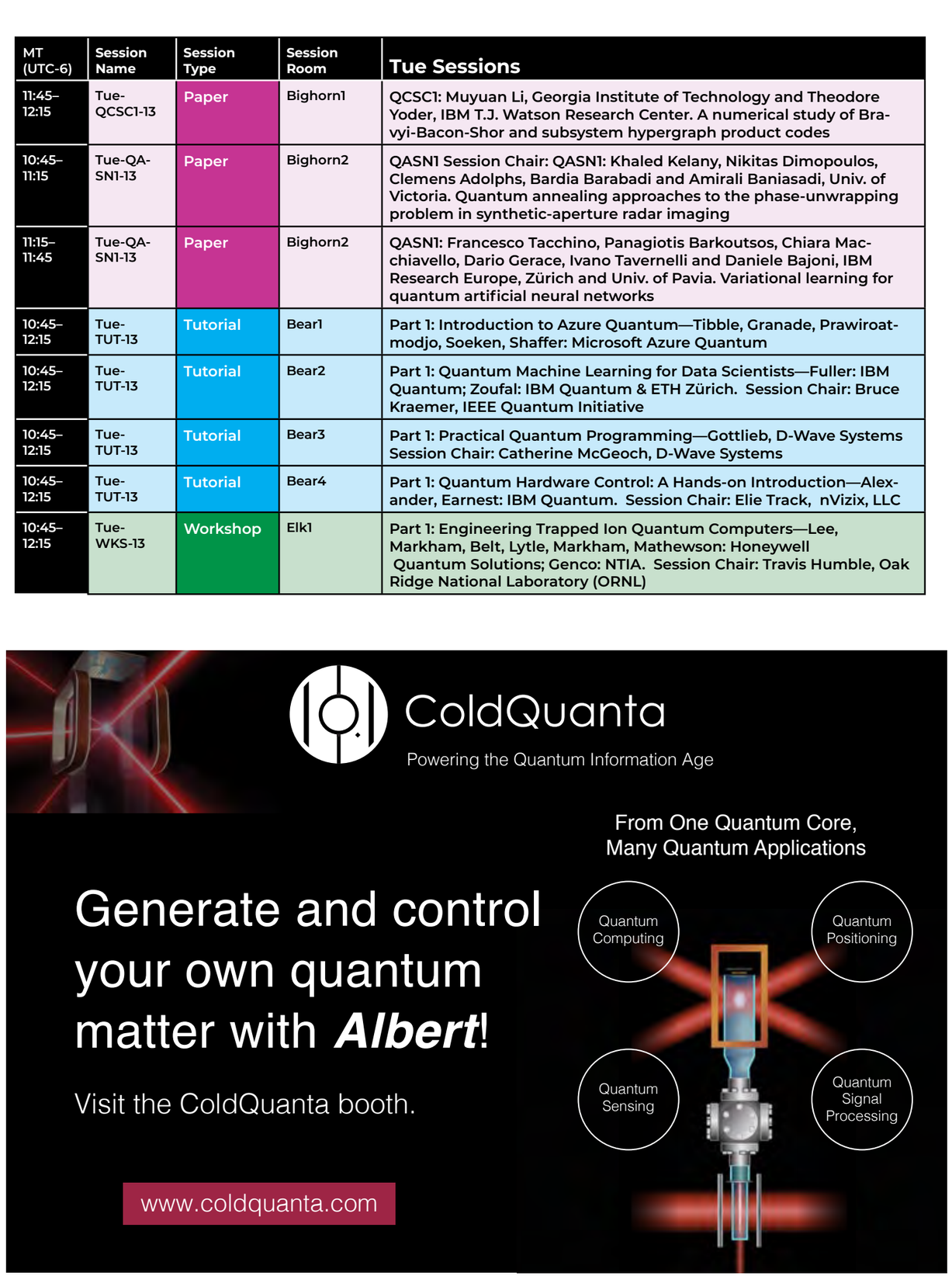
MT (UTC-6)	Session Name	Session Type	Session Room	Tue Sessions
11:45–12:15	Tue-QCSC1-13	Paper	Bighorn1	QCSC1: Muyuan Li, Georgia Institute of Technology and Theodore Yoder, IBM T.J. Watson Research Center. A numerical study of Bravyi-Bacon-Shor and subsystem hypergraph product codes
10:45–11:15	Tue-QASN1-13	Paper	Bighorn2	QASN1 Session Chair: QASN1: Khaled Kelany, Nikitas Dimopoulos, Clemens Adolphs, Bardia Barabadi and Amirali Baniasadi, Univ. of Victoria. Quantum annealing approaches to the phase-unwrapping problem in synthetic-aperture radar imaging
11:15–11:45	Tue-QASN1-13	Paper	Bighorn2	QASN1: Francesco Tacchino, Panagiotis Barkoutsos, Chiara Macchiavello, Dario Gerace, Ivano Tavernelli and Daniele Bajoni, IBM Research Europe, Zürich and Univ. of Pavia. Variational learning for quantum artificial neural networks
10:45–12:15	Tue-TUT-13	Tutorial	Bear1	Part 1: Introduction to Azure Quantum—Tibble, Granade, Prawiroatmodjo, Soeken, Shaffer: Microsoft Azure Quantum
10:45–12:15	Tue-TUT-13	Tutorial	Bear2	Part 1: Quantum Machine Learning for Data Scientists—Fuller: IBM Quantum; Zoufal: IBM Quantum & ETH Zürich. Session Chair: Bruce Kraemer, IEEE Quantum Initiative
10:45–12:15	Tue-TUT-13	Tutorial	Bear3	Part 1: Practical Quantum Programming—Gottlieb, D-Wave Systems Session Chair: Catherine McGeoch, D-Wave Systems
10:45–12:15	Tue-TUT-13	Tutorial	Bear4	Part 1: Quantum Hardware Control: A Hands-on Introduction—Alexander, Earnest: IBM Quantum. Session Chair: Elie Track, nVizix, LLC
10:45–12:15	Tue-WKS-13	Workshop	Elk1	Part 1: Engineering Trapped Ion Quantum Computers—Lee, Markham, Belt, Lytle, Markham, Mathewson: Honeywell Quantum Solutions; Genco: NTIA. Session Chair: Travis Humble, Oak Ridge National Laboratory (ORNL)
10:45–12:15	Tue-WKS-13	Workshop	Elk2	Part 1: Architectural Guidelines and Best Practices for Scalable Circuit QED Quantum Computing—Thiele, Kirste, Mahajan: Zurich Instruments; Wilhelm-Mauch: Saarland Univ. Session Chair: Kristel Michielson, Forschungszentrum Jülich GmbH
10:45–12:15	Tue-WKS-13	Workshop	Elk3	Part 1: Solution Architecture for Quantum Hardware & Software Development—Khan: Khalifa U, Abu Dhabi; Bleiler: Portland State U; Reinhardt: Quantum Computing Inc., Leesburg; Weinstein: MITRE Corp; Dridi: Quantum Computing. Session Chair: Erik DeBenedictis, Zettaflops LLC
10:45–12:15	Tue-WKS-13	Workshop	Elk4	Part 1: Quantum Software Engineering and Technology—Pérez-Castillo: Univ. of Castilla-La Mancha, Spain; Piattini, Peterssen, Hevia: aQuantum, Spain. Session Chair: Hausi Müller, Univ. of Victoria
12:15–13:00	Tue-EH-WE-14	Exhibit	Honeywell	Honeywell Quantum Solutions — Scheduled Exhibits
12:15–13:00	Tue-EC-TR-14	Exhibit	Q-Ctrl	Q-Ctrl — Scheduled Exhibits
12:15–13:00	Tue-EIQM-14	Exhibit	IQM	IQM — Scheduled Exhibits
12:15–13:00	Tue-EE-RO-14	Exhibit	EeroQ	EeroQ - Scheduled Exhibits



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MT (UTC-6)	Session Name	Session Type	Session Room	Tue Sessions
12:15–13:00	Tue-POS-14	Posters	Bison	Ion Trap Hardware and Software Technologies 2 — Poster Session Chair: Winfried Hensinger, Univ. of Sussex Pos1: Quentin Bodart, Foni Lebrun-Gallagher, Nicholas Johnson, Martin Siegele, Seokjun Hong, Sebastian Weidt and Winfried Hensinger: Constructing a scalable trapped-ion quantum computer demonstrator device Pos2: Samuel Hile, Alex Owens, David Bretaud, Raphael Lebrun, Martin Siegele, Seokjun Hong, Reuben Puddy, Sebastian Weidt and Winfried Hensinger: Engineering a scalable logical qubit in a 2D surface ion trap array Pos3: Tomas Navickas, Mitchell Peaks and Chris Knapp: Towards high-fidelity logical gates with trapped ion qubits Pos4: Mark Webber, Steven Herbert, Sebastian Weidt and Winfried Hensinger: Enabling global connectivity in a shuttling based trapped ion quantum computer with efficient routing Pos5: David Bretaud, Samuel Hile, Alexander Owens, Daisy Smith, Sebastian Weidt, Florian Mintert and Winfried Hensinger: Open source quantum code compilation for scalable trapped ion quantum processors
12:15–13:00	Tue-BOF-14	BoF	Hawk	Scheduled BoF Session
12:15–13:00	Tue-NW1-14	Network	WiseOwl1	Networking Session — Meet Quantum Newcomers
12:15–13:00	Tue-NW2-14	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
12:15–13:00	Tue-COL-14	Break	Rockies	Relax in Beautiful Colorado — Hike the Rockies

MT (UTC-6)	Session Name	Session Type	Session Room	Tue Sessions
13:00–13:30	Tue-QCSC2-15	Paper	Bighorn1	QCSC2: Session Chair: Helena Zhang, IBM Quantum. QCSC2: Omar Amer, Walter O. Krawec and Bing Wang, Univ. of Connecticut. Efficient routing for quantum key distribution Networks
13:30–14:00	Tue-QCSC2-15	Paper	Bighorn1	QCSC2: Michel Barbeau, Carleton Univ., Joaquin Garcia-Alfaro, SAMOVAR, Telecom SudParis and Evangelos Kranakis, Carleton Univ. Capacity requirements of quantum repeaters
14:00–14:30	Tue-QCSC2-15	Paper	Bighorn1	QCSC2: Boxi Li, ETH Zürich; Tim Coopmans and David Elkouss, Delft Univ. of Technology. Efficient optimization of cut-offs in quantum repeater chains
13:00–13:30	Tue-QASN2-15	Paper	Bighorn2	QASN2 Session Chair: QASN2: Adam Holmes and Anne Matsuura, Intel Labs. Efficient quantum circuits for accurate preparation of smooth, differentiable quantum states
13:30–14:00	Tue-QASN2-15	Paper	Bighorn2	QASN2: Nicolas Sawaya, Gian Giacomo Guerreschi and Adam Holmes, Intel Labs. On connectivity-dependent resource requirements for digital quantum simulation of d-level particles
13:00–14:30	Tue-TUT-15	Tutorial	Bear1	Part 2: Introduction to Azure Quantum—Tibble, Granade, Prawiroatmodjo, Soeken, Shaffer: Microsoft Azure Quantum
13:00–14:30	Tue-TUT-15	Tutorial	Bear2	Part 2: Quantum Machine Learning for Data Scientists—Fuller: IBM Quantum; Zoufal: IBM Quantum & ETH Zürich
13:00–14:30	Tue-TUT-15	Tutorial	Bear3	Part 2: Practical Quantum Programming—Gottlieb, D-Wave Systems
13:00–14:30	Tue-TUT-15	Tutorial	Bear4	Part 2: Quantum Hardware Control: A Hands-on Introduction—Alexander, Earnest: IBM Quantum

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MT (UTC-6)	Session Name	Session Type	Session Room	Tue Sessions
13:00–14:30	Tue-WKS-15	Workshop	Elk1	Part 2: Engineering Trapped Ion Quantum Computers—Lee, Markham, Belt, Lytle, Markham, Mathewson: Honeywell Quantum Solutions; Genco: NTIA
13:00–14:30	Tue-WKS-15	Workshop	Elk2	Part 2: Architectural Guidelines and Best Practices for Scalable Circuit QED Quantum Computing—Thiele, Kirste, Mahajan: Zurich Instruments; Wilhelm-Mauch: Saarland Univ.
13:00–14:30	Tue-WKS-15	Workshop	Elk3	Part 2: Solution Architecture for Quantum Hardware & Software Development—Khan: Khalifa U, Abu Dhabi; Bleiler: Portland State U; Reinhardt: Quantum Computing Inc., Leesburg; Weinstein: MITRE Corp; Dridi: Quantum Computing
13:00–14:30	Tue-WKS-15	Workshop	Elk4	Part 2: Quantum Software Engineering and Technology—Pérez-Castillo: Univ. of Castilla-La Mancha, Spain; Piattini, Peterssen, Hevia: aQuantum, Spain
14:30–15:15	Tue-EMIC-16	Exhibits	Microsoft	Microsft Quantum - Scheduled Exhibits
14:30–15:15	Tue-EXAN-16	Exhibits	Xanadu	Xanadu - Scheduled Exhibits
14:30–15:15	Tue-EseQ-16	Exhibits	seeQC	seeQC - Scheduled Exhibits

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MT (UTC-6)	Session Name	Session Type	Session Room	Tue Sessions
14:30–15:15	Tue-POS-16	Posters	Bison	Ion Trap Hardware and Software Technologies 3 — Poster Session Chair: Patty Lee, Honeywell Quantum Solutions Pos1: David Allcock, Chris Ballance, Sébastien Bourdeauducq, Joseph Britton, Michal Gaska, Thomas Harty, Jakub Jarosinski, Robert Jördens, Paweł Kulik, David Nadlinger, Krzysztof Pozniak, Tomasz Przywozki, Daniel Slichter, Mikolaj Sowinski, Weida Zhang and Grzegorz Kasprowicz: Sinara: An Open Hardware Ecosystem for Quantum Physics Pos2: Miguel Usach, Jon Kraft and Fintan Leamy: Low noise controllers for Ion-Trap Quantum Computers
14:30–15:15	Tue-BOF-16	BoF	Hawk	Scheduled BoF Session
14:30–15:15	Tue-NW1-16	Network	WiseOwl1	Networking Session — Meet Quantum Experts
14:30–15:15	Tue-NW2-16	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
14:30–15:15	Tue-COL-16	Break	Rockies	Relax in Beautiful Colorado — Ski the Rockies
15:15–15:45	Tue-QCSC3-17	Paper	Bighorn1	QCSC3 Session Chair: Michel Barbeau, Carleton Univ. QCSC3: Randy Kuang and Nicolas Bettenburg, Quantropi Inc., Ottawa. Quantum public key distribution using randomized Glauber states
15:45–16:15	Tue-QCSC3-17	Paper	Bighorn1	QCSC3: Andrew Reinders, Santosh Ghosh, Rafael Misoczki and Manoj Sastry, Intel Labs. Efficient BIKE hardware design with constant-time decoder

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MT (UTC-6)	Session Name	Session Type	Session Room	Tue Sessions
16:15–16:45	Tue-QCSC3-17	Paper	Bighorn1	QCSC3: Noel De la Cruz, Uttam Paudel, Ethan Tucker, Andrew Mollner, Joseph Betser, Pavel Ionov, Joseph Touch and Joshua Stoermer, The Aerospace Corporation El Segundo, California. Decoy-state quantum key distribution with direct modulated commercial off-the-shelf VCSEL lasers
15:15–16:45	Tue-TUT-17	Tutorial	Bear1	Part 3: Introduction to Azure Quantum—Tibble, Granade, Prawiroatmodjo, Soeken, Shaffer: Microsoft Azure Quantum
15:15–16:45	Tue-TUT-17	Tutorial	Bear2	Part 3: Quantum Machine Learning for Data Scientists—Fuller: IBM Quantum; Zoufal: IBM Quantum & ETH Zürich
15:15–16:45	Tue-TUT-17	Tutorial	Bear3	Part 3: Practical Quantum Programming—Gottlieb, D-Wave Systems
15:15–16:45	Tue-TUT-17	Tutorial	Bear4	Part 3: Quantum Hardware Control: A Hands-on Introduction—Alexander, Earnest: IBM Quantum
15:15–16:45	Tue-WKS-17	Workshop	Elk1	Part 3: Engineering Trapped Ion Quantum Computers—Lee, Markham, Belt, Lytle, Markham, Mathewson: Honeywell Quantum Solutions; Genco: NTIA
15:15–16:45	Tue-WKS-17	Workshop	Elk2	Part 3: Architectural Guidelines and Best Practices for Scalable Circuit QED Quantum Computing—Thiele, Kirste, Mahajan: Zurich Instruments; Wilhelm-Mauch: Saarland Univ.
15:15–16:45	Tue-WKS-17	Workshop	Elk3	Part 3: Solution Architecture for Quantum Hardware & Software Development—Khan: Khalifa U, Abu Dhabi; Bleiler: Portland State U; Reinhardt: Quantum Computing Inc., Leesburg; Weinstein: MITRE Corp; Dridi: Quantum Computing

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MT (UTC-6)	Session Name	Session Type	Session Room	Tue Sessions
15:15–16:45	Tue-WKS-17	Workshop	Elk4	Part 3: Quantum Software Engineering and Technology—Pérez-Castillo: Univ. of Castilla-La Mancha, Spain; Piattini, Peterssen, Hevia: aQuantum, Spain
16:45–17:30	Tue-EIBM-18	Exhibits	IBM	IBM Quantum — Scheduled Exhibits
16:45–17:30	Tue-EZAP-18	Exhibits	Zapata	Zapata Computing — Scheduled Exhibits
16:45–17:30	Tue-POS-18	Posters	Bison	Ion Trap Hardware and Software Technologies 4 — PosterSession Chair: Tom Markham, Honeywell Quantum Solutions Pos1: Dave Campagna and Tom Markham: Engineering mid-circuit measurement Pos2: Ryan Daniel: Cryotronics Test Chamber Pos3: Ryan Jacobs: Automated testing methods of surface ion traps in quantum computing Ion Trap Hardware and Software Technologies 3 — PosterSession Chair: Tom Markham, Honeywell Quantum Solutions
16:45–17:30	Tue-BOF-18	BoF	Hawk	Open BoF Session
16:45–17:30	Tue-NW1-18	Network	WiseOwl1	Networking Session — Meet Quantum Experts
16:45–17:30	Tue-NW2-18	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
16:45–17:30	Tue-COL-18	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature

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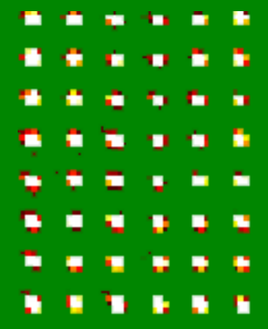

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MT (UTC-6)	Session Name	Session Type	Session Room	Tue Sessions
17:30–19:00	Tue-KEY-19	Keynote	Eagle	Announcements, Awards, Keynote: Yu Chen, Google AI Quantum Lab, USA—Developing Technologies Towards a Error-Corrected Quantum Computer. Candace Culhane, Los Alamos National Laboratory (LANL)
19:00–19:45	Tue-KEY-20	Network	Eagle	Hang out with Keynote Speaker Yu Chen
19:00–19:45	Tue-EX-OP-20	Exhibits	Patrons	Open Exhibits
19:00–19:45	Tue-PO-SO20	Posters	Bison	Open Posters
19:00–19:45	Tue-BOFO-20	BoF	Hawk	Open BoF Session
19:00–19:45	Tue-NW1-20	Network	WiseOwl1	Networking Session — Meet Quantum Experts
19:00–19:45	Tue-NW2-20	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
19:00–19:45	Tue-COL-20	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature

QCE20 Program — Weds., 14 October

MT (UTC-6)	Session Name	Session Type	Session Room	Wed Sessions
08:00–19:45	Wed-ONB-10	Onboard	Discover1	QCE20 Welcome, Onboarding & Quote of the Day
08:00–19:45	Wed-OVE-10	Onboard	Discover2	QCE20 Daily Overview of Sessions & Announcements
08:30–10:00	Wed-KEY-11	Keynote	Eagle	Announcements, Awards, Keynote: Krysta Svore, Microsoft Research, USA—Quantum Learning: Applying Quantum Ideas to Classical Computing. Session Chair: Travis Humble, Oak Ridge National Laboratory (ORNL)
10:00–10:45	Wed-KEY-12	Network	Eagle	Hang out with Keynote Speaker Krysta Svore
10:00–10:45	Wed-EIQM-12	Exhibit	IQM	IQM —Scheduled Exhibits
10:00–10:45	Wed-EN-ET-12	Exhibit	netlabs	netlabs — Scheduled Exhibits
10:00–10:45	Wed-EDEL-12	Exhibit	Delft-Circuits	Delft Circuits — Scheduled Exhibits
10:00–10:45	Wed-EO-XF-12	Exhibit	Oxford-Inst	Oxford Instruments — Scheduled Exhibits
10:00–10:45	Wed-POS-12	Posters	Bison	Hybrid Quantum-Classical Computing and Applications — Poster Session Chair: Ulrike Stege, Univ. of Victoria Pos1: Daniel Claudino, Jerimiah Wright, Alexander McCaskey, Dmitry Lyakh and Travis Humble: VQE Approaches for Quantum Chemistry in XACC Pos2: Prashanti Priya Angara: Problem Solving in the NISQ Era: Exploring Hybrid Quantum-Classical Approaches
10:00–10:45	Wed-BOF-12	BoF	Hawk	Scheduled BoF Session
10:00–10:45	Wed-NW1-12	Network	WiseOwl1	Networking Session — Meet Quantum Newcomers

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Quantum Computing (TQC)

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ACM Transactions on Quantum Computing (TQC) publishes high-impact, original research papers and select surveys on topics in quantum computing and quantum information science. The journal targets the quantum computer science community with a focus on the theory and practice of quantum computing including but not limited to: quantum algorithms and complexity, models of quantum computing, quantum computing architecture, principles and methods of fault-tolerant quantum computation, design automation for quantum computing, issues surrounding compilers for quantum hardware and NISQ implementation, quantum programming languages and systems, distributed quantum computing, quantum networking, quantum security and privacy, and applications (e.g. in machine learning and AI) of quantum computing.

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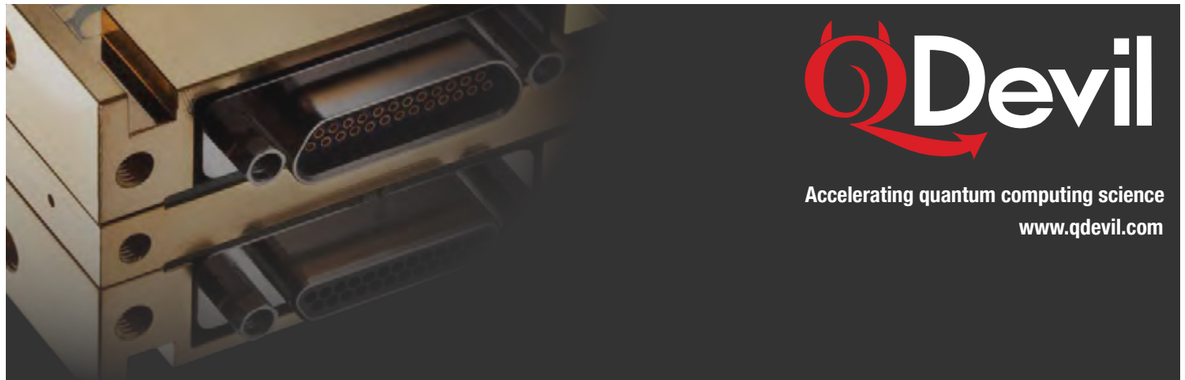
Association for Computing Machinery

MT (UTC-6)	Session Name	Session Type	Session Room	Wed Sessions
10:00–10:45	Wed-NW2-12	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
10:00–10:45	Wed-COL-12	Break	Rockies	Relax in Beautiful Colorado
10:45–11:15	Wed-QC1-13	Paper	Bighorn2	Quantum Computing 1 — QC1 Session Chair: Session Chair: Travis Humble, Oak Ridge National Laboratory (ORNL) QC1: Jun Doi and Hiroshi Horii, IBM Research Tokyo. A cache blocking technique to large scale quantum computing simulation on supercomputers
11:15–11:45	Wed-QC1-13	Paper	Bighorn2	QC1: Davis, Ethan Smith, Ana Tudor, Koushik Sen, Irfan Siddiqi, Univ. of California Berkeley and Costin Iancu, Lawrence Berkeley National Laboratory. Towards depth optimal, topology aware quantum circuit synthesi
10:45–11:15	Wed-QCSC4-13	Paper	Bighorn1	Quantum Communications, Sensing & Cryptography 4 (QCSC4) — Paper Session Chair: Akbar Sayeed, Univ. of Wisconsin QCSC4: Dov Fields, City Univ. of New York; Arpád Varga, Univ. of Pécs,Hungary and Janos Bergou, City Univ. of New York. Sequential measurements on qubits by multiple observers: Joint best guess strategy
11:15–11:45	Wed-QCSC4-13	Paper	Bighorn1	QCSC4: Janis Nötzel and Stephen DiAdamo, Technische Universität München. Entanglement-enhanced communication networks
11:45–12:15	Wed-QCSC4-13	Paper	Bighorn1	QCSC4: Randy Kuang and Nicolas Bettenburg, Quantropi Inc., Ottawa. Shannon perfect secrecy in a discrete Hilbert space
10:45–12:15	Wed-TUT-13	Tutorial	Bear1	Part 1: Quantum Algorithms for Optimization—Woerner, Scholten: IBM Quantum. Session Chair: Ulrike Stege, Univ. of Victoria



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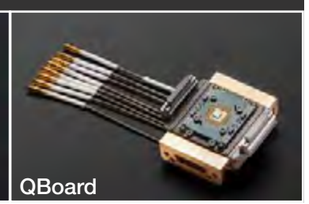
QBoard

MT (UTC-6)	Session Name	Session Type	Session Room	Wed Sessions
10:45–12:15	Wed-TUT-13	Tutorial	Bear2	Part 1: Quantum Machine Learning with PennyLane—Killoran, Izaac: Xanadu Toronto. Session Chair: Candace Culhane, Los Alamos National Laboratory (LANL)
10:45–12:15	Wed-TUT-13	Tutorial	Bear3	Part 1: Preparing the Future Quantum Workforce—Venegas-Gomez, QURECA Ltd., Glasgow. Session Chair: Bruce Kraemer, IEEE Quantum Initiative
10:45–12:15	Wed-WKS-13	Workshop	Elk1	Part 1: Quantum Curriculum Development with Microsoft Quantum Development Kit—Tsang, Mykhailova: Microsoft Quantum Research Session Chair: Scott Koziol, Baylor Univ.
10:45–12:15	Wed-WKS-13	Workshop	Elk2	Part 1: Tuning Strategies for Quantum Annealing—Grant, ORNL; McGeoch: D-Wave Systems. Session Chair: Kristel Michielson, Forschungszentrum Jülich GmbH
10:45–12:15	Wed-WKS-13	Workshop	Elk3	Part 1: Qubit Control Requirements for Practical Scalable Quantum Computation—Root: Keysight Technologies, Santa Rosa; Messaoudi: Keysight Technologies, Waterloo. Session Chair: Travis Humble, Oak Ridge National Laboratory (ORNL)
10:45–12:15	Wed-WKS-13	Workshop	Elk4	Part 1: Photonics-based Quantum Computing and Simulation—Chrostowski, UBC; McKinstrie, LGS; Srinivasan, NIST. Amr Helmy, Univ. of Toronto
12:15–13:00	Wed-EMIC-14	Exhibit	Microsoft	Microsoft Quantum — Scheduled Exhibits
12:15–13:00	Wed-EQM-14	Exhibit	QM	Quantum Machines (QM) — Scheduled Exhibits
12:15–13:00	Wed-ETOP-14	Exhibit	Toptica	Toptica — Scheduled Exhibits
12:15–13:00	Wed-EZUR-14	Exhibit	Zurich-Inst	Zurich Instruments— Scheduled Exhibits
12:15–13:00	Wed-POS-14	Posters	Bison	Quantum Machine Learning (QML) — Poster Session Chair: Andreas Bergen, engageLively Pos1: Siddharth Sharma: Implementing a Novel Quantum K-Nearest Neighbors Learning Algorithm for Breast Cancer Detection Pos2: Vinit Kumar Singh and Brenda Rubenstein: Quantum Neural Networks for Analyzing X-Ray Scattering Data
12:15–13:00	Wed-BOF-14	BoF	Hawk	High Quantum Computing in Energy Energy Physics BoF
12:15–13:00	Wed-NW1-14	Network	WiseOwl1	Networking Session Meet Quantum Newcomers
12:15–13:00	Wed-NW2-14	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
12:15–13:00	Wed-COL-14	Break	Rockies	Relax in Beautiful Colorado — Hike the Rockies
13:00–13:30	Wed-QC2-15	Paper	Bighorn1	Quantum Computing 2 — QC2 Session Chair: Natalie Brown, Honeywell Quantum Solutions QC2: Elijah Pelofske, Los Alamos National Laboratory; Georg Hahn, Harvard Univ. and Hristo Djidjev, Los Alamos National Laboratory. Advanced anneal paths for improved quantum annealing
13:30–14:00	Wed-QC2-15	Paper	Bighorn1	QC2: Wim Lavrijsen, Lawrence Berkeley National Laboratory; Ana Tudor, Univ. of California Berkeley; Juliane Mueller, Costin Iancu and Wibe De Jong, Lawrence Berkeley National Laboratory. Classical optimizers for noisy intermediate-scale quantum devices
13:30–14:00	Wed-QC2-15	Paper	Bighorn1	QC2: Tudor Giurgica-Tiron, Yousef Hindy, Stanford Univ.; Ryan LaRose, Michigan State Univ.; Andrea Mari, Xanadu and William Zeng, Goldman, Sachs & Co, Unitary Fund. Portable and efficient zero noise extrapolation for quantum error mitigation

MT (UTC-6)	Session Name	Session Type	Session Room	Wed Sessions
13:00–14:30	Wed-PAN-15	Panel	Moose	Pivoting into Quantum Computing. Organizers: Abraham Asfaw, Rajeev Malik, Travis Scholten: IBM Quantum. Moderator: Travis Humble, Oak Ridge National Lab. Panelists: Luuk Ament, Julianna Murphy, Andrew Wack, Paco Martin, Jessie Yu, Ben Fearon, IBM. Session Chair: Terence Martinez, IEEE Quantum Initiative.
13:00–14:30	Wed-TUT-15	Tutorial	Bear1	Part 2: Quantum Algorithms for Optimization—Woerner, Scholten: IBM Quantum
13:00–14:30	Wed-TUT-15	Tutorial	Bear2	Part 2: Quantum Machine Learning with PennyLane—Killoran, Izaac: Xanadu Toronto
13:00–14:30	Wed-TUT-15	Tutorial	Bear3	Part 2: Preparing the Future Quantum Workforce—Venegas-Gomez, QURECA Ltd., Glasgow
13:00–14:30	Wed-WKS-15	Workshop	Elk1	Part 2: Quantum Curriculum Development with Microsoft Quantum Development Kit—Tsang, Mykhailova: Microsoft Quantum Research
13:00–14:30	Wed-WKS-15	Workshop	Elk2	Part 2: Tuning Strategies for Quantum Annealing—Grant, ORNL; McGeoch: D-Wave Systems
13:00–14:30	Wed-WKS-15	Workshop	Elk3	Part 2: Qubit Control Requirements for Practical Scalable Quantum Computation—Root: Keysight Technologies, Santa Rosa; Messaoudi: Keysight Technologies, Waterloo
13:00–14:30	Wed-WKS-15	Workshop	Elk4	Part 2: Photonics-based Quantum Computing and Simulation—Chrostowski, UBC; McKinstrie, LGS; Srinivasan, NIST
14:30–15:15	Wed-EIBM-16	Exhibits	IBM	IBM Quantum — Scheduled Exhibits
14:30–15:15	Wed-EZAP-16	Exhibits	Zapata	Zapata — Scheduled Exhibits
14:30–15:15	Wed-EALI-16	Exhibits	Aliro	Aliro Quantum — Scheduled Exhibits
14:30–15:15	Wed-POS-16	Posters	Bison	Variational Techniques — Poster Session Chair: Ulrike Stege, Univ. of Victoria Pos1: Zak Webb: On the Universality of the Variational Quantum Eigensolver Framework Pos2: Slimane Thabet and Jean-Francois Hullo: Spectral embedding of graphs using quantum variational circuits
14:30–15:15	Wed-BOF-16	BoF	Hawk	Scheduled BoF Session
14:30–15:15	Wed-NW1-16	Network	WiseOwl1	Networking Session — Meet Quantum Experts
14:30–15:15	Wed-NW2-16	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
14:30–15:15	Wed-COL-16	Break	Rockies	Relax in Beautiful Colorado — Ski the Rockies
15:15–15:45	Wed-QC3-17	Paper	Bighorn1	Quantum Computing 3 (QC3) — Paper Session Chair: Andrew Sornberger, Loas Alamos National Laboratory (LANL) QC3: Natalie Brown, Georgia Institute of Technology; Andrew Cross, IBM T.J. Watson Research Center and Kenneth Brown, Duke Univ. Critical faults of leakage errors on the surface code
15:45–16:15	Wed-QC3-17	Paper	Bighorn1	QC3: Jack Raymond, D-Wave Systems Burnaby, Guatum Rayaprolu, Ndiame Ndiaye, McGill Univ. and Andrew King, D-Wave Systems Burnaby. Improving performance of logical qubits by parameter tuning and topology compensation
15:45–16:15	Wed-QC3-17	Paper	Bighorn1	QC3: Shavindra Premaratne and Anne Matsuura, Intel Labs. Engineering the cost function of a variational quantum algorithm for implementation on near-term devices

IEEE COMPUTER SOCIETY

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Curate your conference experience by determining your goals and priorities ahead of time. By creating a plan, you'll gain the most from the event. Virtual conferences flow differently than in-person events, so schedule time for breaks, networking, and exploration. Also, be mindful of time zones and plan your availability accordingly.

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5. Minimize Distractions

Attending a conference virtually comes with its own set of distractions. Treat the conference as the unique learning experience that it is! Turn off your email notifications. Set up a dedicated space for attending your event. Gather whatever you need to stay comfortable. Resist distractions—this time is an investment in yourself.

6. Change Your Mindset

You may not have traveled to the conference, but treat the conference as seriously as if you had. Block off the time and use it to attend the virtual conference.

7. Network and Engage

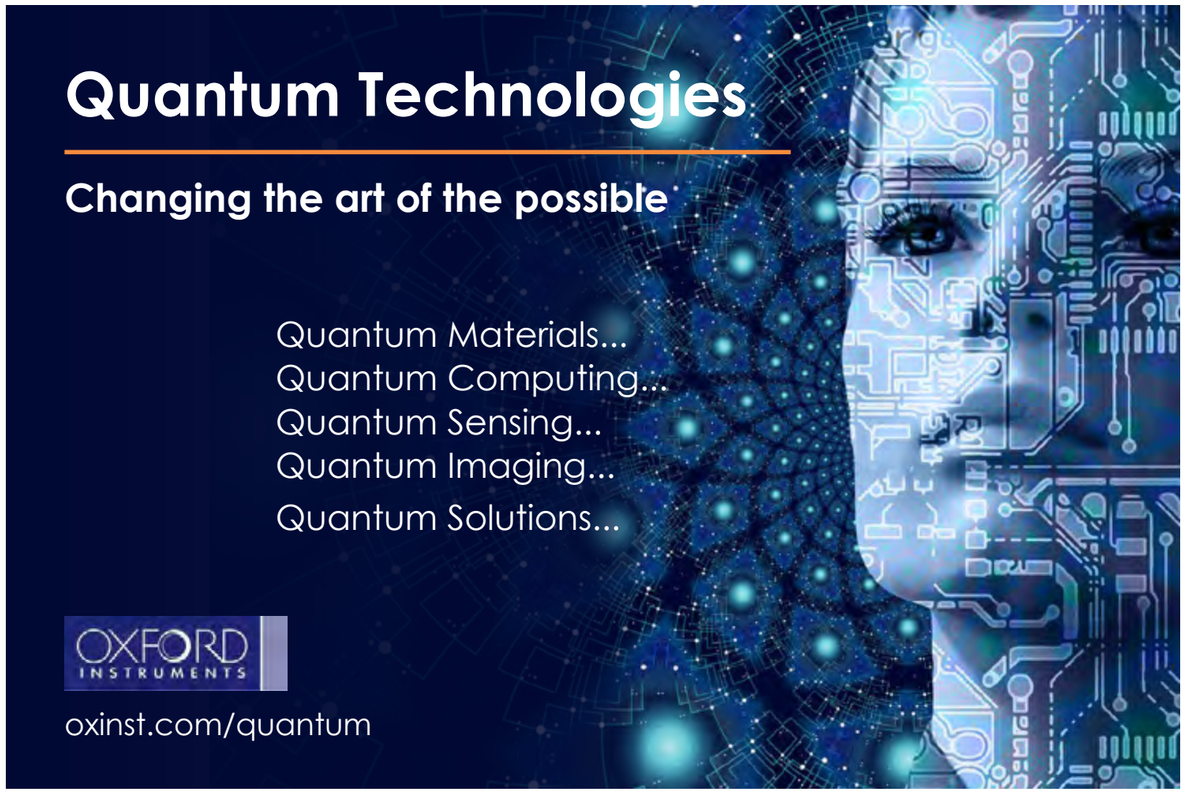
Don't miss an opportunity to network with other attendees and engage with the sessions and presenters. Utilize the chat features, online meeting rooms, and social media to connect with other attendees. Join discussions that interest you, and participate by asking questions during the many Q&A opportunities.

IEEE

MT (UTC-6)	Session Name	Session Type	Session Room	Wed Sessions
15:15–16:45	Wed-PAN-17	Panel	Moose	Towards a Practical Intermediate Representation (IR) for Quantum. Organizer/Moderator: Yudong Cao: Zapata Computing Panelists: Blake Johnson, IBM; Sonika Johri, IonQ; Justin Hogaboam, Intel; Bettina Heim, Microsoft; Ntwali Toussaint, Zapata Computing; Will Zeng, Goldman Sachs. Session Chair: Mehdi Bozzo-Rey, Cambridge Quantum Computing (CQC).
15:15–16:45	Wed-TUT-17	Tutorial	Bear1	Part 3: Quantum Algorithms for Optimization—Woerner, Scholten: IBM Quantum
15:15–16:45	Wed-TUT-17	Tutorial	Bear2	Part 3: Quantum Machine Learning with PennyLane—Killoran, Izaac: Xanadu Toronto
15:15–16:45	Wed-TUT-17	Tutorial	Bear3	Part 3: Preparing the Future Quantum Workforce—Venegas-Gomez, QURECA Ltd., Glasgow
15:15–16:45	Wed-WKS-17	Workshop	Elk1	Part 3: Quantum Curriculum Development with Microsoft Quantum Development Kit—Tsang, Mykhailova: Microsoft Quantum Research
15:15–16:45	Wed-WKS-17	Workshop	Elk2	Part 3: Tuning Strategies for Quantum Annealing—Grant, ORNL; McGeoch: D-Wave Systems
15:15–16:45	Wed-WKS-17	Workshop	Elk3	Part 3: Qubit Control Requirements for Practical Scalable Quantum Computation—Root: Keysight Technologies, Santa Rosa; Messaoudi: Keysight Technologies, Waterloo
15:15–16:45	Wed-WKS-17	Workshop	Elk4	Part 3: Photonics-based Quantum Computing and Simulation—Chrostowski, UBC; McKinstrie, LGS; Srinivasan, NIST
16:45–17:30	Wed-EH-WE-18	Exhibits	Honeywell	Honeywell Quantum Solutions — Scheduled Exhibits
16:45–17:30	Wed-EX-AN-18	Exhibits	Xanadu	Xanadu — Scheduled Exhibits
16:45–17:30	Wed-POS-18	Posters	Bison	Open Posters
16:45–17:30	Wed-BOF-18	BoF	Hawk	Open BoF Session
16:45–17:30	Wed-NW1-18	Network	WiseOwl1	Networking Session — Meet Quantum Experts
16:45–17:30	Wed-NW2-18	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
16:45–17:30	Wed-COL-18	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature
17:30–19:00	Wed-KEY-19	Keynote	Eagle	Announcements, Awards, Keynote: Kae Nemoto, National Insitute of Informatics (NII), Japan—The Internet of Quantum Things. Amr Helmy, Univ. of Toronto
19:00–19:45	Wed-KEY-20	Network	Eagle	Hang out with Keynote Speaker Kae Nemoto
19:00–19:45	Wed-EX-OP-20	Exhibits	Patrons	Open Exhibits
19:00–19:45	Wed-POS-20	Posters	Bison	Open Posters
19:00–19:45	Wed-BOF-20	BoF	Hawk	Open BoF Session
19:00–19:45	Wed-NW1-20	Network	WiseOwl1	Networking Session — Meet Quantum Experts
19:00–19:45	Wed-NW2-20	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
19:00–19:45	Wed-COL-20	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature

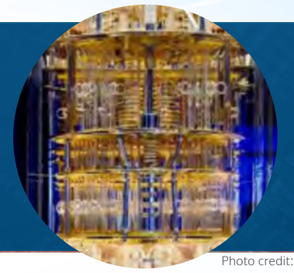
QCE20 Program — Thu, 15 October

MT (UTC-6)	Session Name	Session Type	Session Room	Thu Sessions
08:00–19:45	Thu-ONB-10	Onboard	Discover1	QCE20 Welcome, Onboarding & Quote of the Day
08:00–19:45	Thu-OVE-10	Onboard	Discover2	QCE20 Daily Overview of Sessions & Announcements
08:30–10:00	Thu-KEY-11	Keynote	Eagle	Announcements, Awards, Keynote: Alán Aspuru-Guzik, Univ. of Toronto, Canada—Quantum Computing for Chemistry and Materials Simulation in Near-term Devices. Session Chair: Greg Byrd, NC State Univ.
10:00–10:45	Thu-KEY-12	Network	Eagle	Hang out with Keynote Speaker Alán Aspuru-Guzik
10:00–10:45	Thu-ECMC-12	Exhibit	CMC	CMC — Scheduled Exhibits
10:00–10:45	Thu-ECTR-12	Exhibit	Q-Ctrl	Q-Ctrl — Scheduled Exhibits
10:00–10:45	Thu-EBLU-12	Exhibit	Bluefors	Bluefors — Scheduled Exhibits
12:15–13:00	Thu-EZUR-14	Exhibit	Zurich-Inst	Zurich Instruments — Scheduled Exhibits



MT (UTC-6)	Session Name	Session Type	Session Room	Thu Sessions
10:00–10:45	Thu-POS-12	Posters	Bison	Quantum Optimization 1 — Poster Session Chair: Urike Stege, Univ. of Victoria Pos1: Sara Ayman Metwalli, Francois Le Gall and Rodney Van Meter: A Practical Quantum Approach to the k-clique Problem Pos2: Rebekah Herrman, Phillip Lotshaw, James Ostrowski and Travis Humble: Graph Coloring, Circuit Depth, & Optimality in QAOA
10:00–10:45	Thu-BOF-12	BoF	Hawk	Scheduled BoF Session
10:00–10:45	Thu-NW1-12	Network	WiseOwl1	Networking Session — Meet Quantum Newcomers
10:00–10:45	Thu-NW2-12	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
10:00–10:45	Thu-COL-12	Break	Rockies	Relax in Beautiful Colorado
10:45–11:15	Thu-QC4-13	Paper	Bighorn1	QC4 Session Chair: Megan Lilly, Univ. of Tennessee QC4: Toshinari Itoko and Takashi Imamichi, IBM Research Tokyo. Scheduling of operations in quantum compiler
11:15–11:45	Thu-QC4-13	Paper	Bighorn1	QC4: Ellis Wilson, Sudhakar Singh and Frank Mueller, North Carolina State Univ. Just-in-time quantum circuit transpilation reduces noise
11:45–12:15	Thu-QC4-13	Paper	Bighorn1	QC4: Lukas Burgholzer, Johannes Kepler Univ. Linz; Rudy Raymond, IBM Research Tokyo and Robert Wille, Johannes Kepler Univ. Linz. Verifying results of the IBM Qiskit quantum circuit compilation flow
10:45–11:15	Thu-QEDU-13	Paper	Bighorn2	QEDU Session Chair: Scott Koziol, Baylor Univ. QEDU: Parham Pashaei, Haris Amiri, Rafael Haenel, Pedro Lopes and Lukas Chrostowski, The Univ. of British Columbia. Education resources for promoting talent in quantum computing
11:15–11:45	Thu-QEDU-13	Paper	Bighorn2	QEDU: Prashanti Angara, Ulrike Stege and Andrew MacLean, Univ. of Victoria. Quantum computing for high school students: An experience report
11:45–12:15	Thu-QEDU-13	Paper	Bighorn2	QEDU: Thomas Plunkett, Terrill Frantz, Hamida Khatri, Praveen Ragendran and Sunny Midha, Harrisburg Univ. of Science and Technology. A Survey of Quantum Computing Workforce Education
10:45–12:15	Thu-TUT-13	Tutorial	Bear1	Part 1: Assessing the Quality of Qubits and Quantum Computers—Córcoles, Scholten: IBM Quantum Session Chair: Elie Track, nVizix, LLC LLC
10:45–12:15	Thu-TUT-13	Tutorial	Bear2	Part 1: Quantum Algorithms for Chemical Simulation—Barkoutos, Jones, Ollitrault, Earnest: IBM Quantum Session Chair: Hausi Müller, Univ. of Victoria
10:45–12:15	Thu-TUT-13	Tutorial	Bear3	Part 1: Combinatorial Optimization on Quantum Computers—Shaydulin, Safro: Clemson Univ.; Alexeev: Argonne Session Chair: Ulrike Stege, Univ. of Victoria
10:45–12:15	Thu-WKS-13	Workshop	Elk1	Part 1: Photonic Technologies for Quantum Information Science—Chrostowski, UBC; McKinstrie, LGS; Srinivasan, NIST Amr Helmy, Univ. of Toronto
10:45–12:15	Thu-WKS-13	Workshop	Elk2	Part 1: Cryogenic Electronics for Quantum Systems—Fahim: Fermilab, IL Charbon: EPFL, Switzerland. Session Chair: Erik DeBenedictis, Zettaflops, LLC
10:45–12:15	Thu-WKS-13	Workshop	Elk3	Part 1: Practical Quantum Sensing from a Photonic and Atomic Physics Perspective—Pooser, Humble: ORNL. Session Chair: Travis Humble, Oak Ridge National Laboratory (ORNL)
10:45–12:15	Thu-WKS-13	Workshop	Elk4	Part 1: IEEE P7130 Quantum Technology Nomenclature Working Group Meeting—IEEE P7130 Working Group. Session Chair: Bruce Kraemer, IEEE Quantum Initiative
12:15–13:00	Thu-EZAP-14	Exhibit	Zapata	Zapata — Scheduled Exhibits
12:15–13:00	Thu-EINT-14	Exhibit	Intel-Labs	Intel Labs — Scheduled Exhibits
12:15–13:00	Thu-EP-AS-14	Exhibit	Pasqal	Pasqal — Scheduled Exhibits
12:15–13:00	Thu-ETQC-14	Exhibit	ACM-TQC	ACM TQC — Scheduled Exhibits
12:15–13:00	Thu-POS-14	Posters	Bison	Quantum Optimization 2 — Poster Session Chair: Andreas Bergen, engageLively Pos1: Matias Jonsson, Jason Larkin and Gian Guerreschi: Assessment of Alternative Objective Functions for Quantum Variational Combinatorial Optimization Pos2: Alex Fischer and Don Towsley: Distributing Graph States Across Quantum Networks
12:15–13:00	Thu-BOF-14	BoF	Hawk	Quantum Information Science at Argonne National Laboratory BoF
12:15–13:00	Thu-NW1-14	Network	WiseOwl1	Networking Session — Meet Quantum Newcomers
12:15–13:00	Thu-NW2-14	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
12:15–13:00	Thu-COL-14	Break	Rockies	Relax in Beautiful Colorado — Hike the Rockies
13:00–13:30	Thu-QC5-15	Paper	Bighorn1	QC5 Session Chair: Alex McCaskey, Oak Ridge National Laboratory (ORNL). QC5: Mathias Soeken and Martin Roetteler, Microsoft Quantum. Quantum circuits for functionally controlled NOT gates

CMC MICROSYSTEMS



Quantum

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LAB

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- Platform technologies to speed your research
- Test equipment loans for short term needs
- Technical contract services including quantum coding
- Constructing research networks
- International partnerships for unique needs

MT (UTC-6)	Session Name	Session Type	Session Room	Thu Sessions
13:30–14:00	Thu-QC5-15	Paper	Bighorn1	QC5: Sima Esfandiarpour Borujeni, Wichita State Univ.; Nam Nguyen, Boeing Research & Technology; Saideep Nannapaneni, Elizabeth Behrman and James Steck, Wichita State Univ. Experimental evaluation of quantum Bayesian networks on IBM QX hardware
14:00–14:30	Thu-QC5-15	Paper	Bighorn1	QC5: Pranav Gokhale, Univ. of Chicago; Olivia Angiuli, Univ. of California, Berkeley; Yongshan Ding, Kaiwen Gui, Univ. of Chicago; Teague Tomesh, Princeton Univ. & Argonne National Laboratory; Martin Suchara, Univ. of Chicago & Argonne National Laboratory; Margaret Martonosi, Princeton Univ. and Frederic T. Chong, Univ. of Chicago. Optimization of simultaneous measurement for variational quantum eigensolver applications
13:00–14:30	Thu-PAN-15	Panel	Moose	Training the Next Generation of Quantum Scientists, Engineers, and Software Developers. Organizers: Abraham Asfaw, Rajeev Malik, Travis Scholten: IBM Quantum; Moderator: Irene Qualters, LANL. Panelists: Sophia Economou, Virginia Tech; Matt Langione, Boston Consulting Group; Peter Johnson, Zapata Computing; AbrahamAsfaw, IBM Quantum; Steve Sanders, Honeywell. Session Chair: Candace Culhane, LANL.
13:00–14:30	Thu-TUT-15	Tutorial	Bear1	Part 2: Assessing the Quality of Qubits and Quantum Computers—Córcoles, Scholten: IBM Quantum
13:00–14:30	Thu-TUT-15	Tutorial	Bear2	Part 2: Quantum Algorithms for Chemical Simulation—Barkoutos, Jones, Ollitrault, Earnest: IBM Quantum
13:00–14:30	Thu-TUT-15	Tutorial	Bear3	Part 2: Combinatorial Optimization on Quantum Computers—Shaydulin, Safro: Clemson Univ.; Alexeev: Argonne
13:00–14:30	Thu-WKS-15	Workshop	Elk1	Part 2: Photonic Technologies for Quantum Information Science—Chrostowski, UBC; McKinstrie, LGS; Srinivasan, NIST
13:00–14:30	Thu-WKS-15	Workshop	Elk2	Part 2: Cryogenic Electronics for Quantum Systems—Fahim: Fermilab, IL Charbon: EPFL, Switzerland
13:00–14:30	Thu-WKS-15	Workshop	Elk3	Part 2: Practical Quantum Sensing from a Photonic and Atomic Physics Perspective—Pooser, Humble: ORNL
13:00–14:30	Thu-WKS-15	Workshop	Elk4	Part 2: IEEE P7130 Quantum Technology Nomenclature Working Group Meeting—IEEE P7130 Working Group
14:30–15:15	Thu-EQUA-16	Exhibits	Quantropi	Quantropi — Scheduled Exhibits
14:30–15:15	Thu-ECOQ-16	Exhibits	ColdQuanta	ColdQuanta — Scheduled Exhibits
14:30–15:15	Thu-ETQE-16	Exhibits	IEEE-TQE	IEEE TQE — Scheduled Exhibits
14:30–15:15	Thu-POS-16	Posters	Bison	Open Posters
14:30–15:15	Thu-BOF-16	BoF	Hawk	Quantum Education Harrisburg University BoF
14:30–15:15	Thu-NW1-16	Network	WiseOwl1	Networking Session — Meet Quantum Experts
14:30–15:15	Thu-NW2-16	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
14:30–15:15	Thu-COL-16	Break	Rockies	Relax in Beautiful Colorado — Ski the Rockies
15:15–15:45	Thu-QC6-17	Paper	Bighorn1	QC6 Session Chair: Pranav Gokhale, Univ. of Chicago. QC6: Thien Nguyen, Anthony Santana and Alexander McCaskey, Oak Ridge National Laboratory. Extending XACC for quantum optimal control
15:45–16:15	Thu-QC6-17	Paper	Bighorn1	QC6: C. A. Morrison, A. J. Landahl, D. S. Lobser, K. M. Rudinger, A. E. Russo, J. W. Van Der Wall and Peter Maunz, Sandia National Laboratories and Univ. of New Mexico. Just another quantum assembly language (Jaqal)

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MT (UTC-6)	Session Name	Session Type	Session Room	Thu Sessions
15:15–16:45	Thu-PAN-17	Panel	Moose	Bringing Quantum Programming into Quantum Computing Education. Organizer: Mark Tsang, Microsoft; Moderator: Mariia Mykhailova, Microsoft; Panelists: Mathias Soeken, EPFL/MSFT, Jens Palsberg, UCLA, Brian La Cour, UT-Austin, Rafael Sotelo, Univ. Montevideo, George Siopsis, Univ. of Tennessee, Christopher Ferrie, Univ. Technology Sydney (UTS). Session Chair: Scott Koziol, Baylor Univ.
15:15–16:45	Thu-TUT-17	Tutorial	Bear1	Part 3: Assessing the Quality of Qubits and Quantum Computers—Córcoles, Scholten: IBM Quantum
15:15–16:45	Thu-TUT-17	Tutorial	Bear2	Part 3: Quantum Algorithms for Chemical Simulation—Barkoutos, Jones, Ollitrault, Earnest: IBM Quantum
15:15–16:45	Thu-TUT-17	Tutorial	Bear3	Part 3: Combinatorial Optimization on Quantum Computers—Shaydulin, Safro: Clemson Univ.; Alexeev: Argonne
15:15–16:45	Thu-WKS-17	Workshop	Elk1	Part 3: Photonic Technologies for Quantum Information Science—Chrostowski, UBC; McKinstrie, LGS; Srinivasan, NIST
15:15–16:45	Thu-WKS-17	Workshop	Elk2	Part 3: Cryogenic Electronics for Quantum Systems—Fahim: Fermilab, IL Charbon: EPFL, Switzerland
15:15–16:45	Thu-WKS-17	Workshop	Elk3	Part 3: Practical Quantum Sensing from a Photonic and Atomic Physics Perspective—Pooser, Humble: ORNL
15:15–16:45	Thu-WKS-17	Workshop	Elk4	Part 3: IEEE P7130 Quantum Technology Nomenclature Working Group Meeting—IEEE P7130 Working Group
16:45–17:30	Thu-EMIC-18	Exhibits	Microsoft	Microsoft Quantum — Scheduled Exhibits
16:45–17:30	Thu-EALI-18	Exhibits	Aliro	Aliro Quantum — Scheduled Exhibits
16:45–17:30	Thu-POS-18	Posters	Bison	Open Posters
16:45–17:30	Thu-BOF-18	BoF	Hawk	Open BoF Session
16:45–17:30	Thu-NW1-18	Network	WiseOwl1	Networking Session — Meet Quantum Experts
16:45–17:30	Thu-NW2-18	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
16:45–17:30	Thu-COL-18	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature
17:30–19:00	Thu-KEY-19	Keynote	Eagle	Announcements, Awards, Keynote: Anne Matsuura, Intel Labs, USA—Quantum Computing: A Scalable, Systems Approach. Session Chair: Candace Culhane, Los Alamos National Laboratory (LANL)
19:00–19:45	Thu-KEY-20	Network	Eagle	Hang out with Keynote Speaker Anne Matsuura
19:00–19:45	Thu-EXOP-20	Exhibits	Patrons	Open Exhibits
19:00–19:45	Thu-POS-20	Posters	Bison	Open Posters
19:00–19:45	Thu-BOFO-20	BoF	Hawk	Open BoF Session
19:00–19:45	Thu-NW1-20	Network	WiseOwl1	Networking Session — Meet Quantum Experts
19:00–19:45	Thu-NW2-20	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
19:00–19:45	Thu-COL-20	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature

QCE20 Program — Friday, 16 October

MT (UTC-6)	Session Name	Session Type	Session Room	Friday Sessions
08:00–19:45	Fri-ONB-10	Onboard	Discover1	QCE20 Welcome, Onboarding & Quote of the Day
08:00–19:45	Fri-OVE-10	Onboard	Discover2	QCE20 Daily Overview of Sessions & Announcements
08:30–10:00	Fri-KEY-11	Keynote	Eagle	Announcements, Awards, Keynote: Jake Taylor, NIST, QuICS, JQI, Univ. of Maryland, USA—Advances in Quantum Information Science Session Chair: Erik DeBenedictis, Zettaflops LLC
10:00–10:45	Fri-KEY-12	Network	Eagle	Hang out with Keynote Speaker Jake Taylor
10:00–10:45	Fri-EIBM-12	Exhibit	IBM	IBM Quantum — Scheduled Exhibits
10:00–10:45	Fri-ENCS-12	Exhibit	NC-State	NC State — Scheduled Exhibits
10:00–10:45	Fri-EQDE-12	Exhibit	QDevil	QDevil — Scheduled Exhibits
10:00–10:45	Fri-POS-12	Posters	Bison	Quantum Simulation 1 — Poster Session Chair: Travis Humble, Oak Ridge National Laboratory (ORNL) Pos1: Megan Lilly and Travis Humble: Evaluating Performance of Quantum Computers with Cycle Benchmarking Pos2: Paul Kairys and Travis Humble: High performance digital quantum simulation through analog control optimization
10:00–10:45	Fri-BOF-12	BoF	Hawk	Scheduled BoF Session
10:00–10:45	Fri-NW1-12	Network	WiseOwl1	Networking Session — Meet Quantum Newcomers
10:00–10:45	Fri-NW2-12	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
10:00–10:45	Fri-COL-12	Break	Rockies	Relax in Beautiful Colorado
10:45–11:15	Fri-QBM1-13	Papers	Bighorn1	QBM1 Session Chair: Catherine MCGeoch, D-Wave Systems QBM1: Kathleen Hamilton, Tyler Kharazi, Titus Morris, Alex McCaskey, Ryan Bennink and Raphael Pooser, Oak Ridge National Laboratory. Scalable quantum processor noise characterization
11:15–11:45	Fri-QBM1-13	Papers	Bighorn1	QBM1: Sam Tomkins and Rogério de Sousa, University of Victoria. Noise mitigation with delay pulses in the IBM Quantum Experience
10:45–12:15	Fri-TUT-13	Tutorial	Bear1	Part 1: Cirq for NISQ: Research and Education—LaRose, Hoffman: Google AI Quantum. Session Chair: Scott Koziol, Baylor Univ.
10:45–12:15	Fri-TUT-13	Tutorial	Bear2	Part 1: Serious Games for Quantum Computing—Lahmann, Heider: IBM Germany. Session Chair: Bruce Kraemer, IEEE Quantum Initative
10:45–12:15	Fri-TUT-13	Tutorial	Bear3	Part 1: Exploring the D-Wave Webinar Series—Gottlieb, D-Wave Systems. Session Chair: Catherine McGeoch, D-Wave Systems
10:45–12:15	Fri-WKS-13	Workshop	Elk1	Part 1: Technology Roadmapping for Quantum Computing—Holmes, DeBenedictis: IEEE IRDS. Session Chair: Erik DeBenedictis, Zettaflops, LLC
10:45–12:15	Fri-WKS-13	Workshop	Elk2	Part 1: Control and Design of Superconducting Qubits—Bronn, Minev, Scholten: IBM Quantum. Session Chair: Kristel Michielson, Forschungszentrum Jülich GmbH
10:45–12:15	Fri-WKS-13	Workshop	Elk3	Part 1: Quantum Computing Entrepreneurship—Chen, Sotelo, Monaco, Stauffer, Sumner: TEMS Society & IEEE Entrepreneurship. Session Chair: Hausi Müller, Univ. of Victoria
10:45–12:15	Fri-WKS-13	Workshop	Elk4	Part 1: Quantum Simulation—Alexeev, Otten: Argonne National Laboratory; Mandrà, NASA Ames. Session Chair: Ulrike Stege, Univ. of Victoria

MT (UTC-6)	Session Name	Session Type	Session Room	Friday Sessions
10:45–12:15	Fri-WKS-13	Workshop	Elk5	Part 1: Quantum Computing Opportunities in Renewable Energy—Eldredge: U.S. Department of Energy; Giani: GE Research. Session Chair: Travis Humble, Oak Ridge National Laboratory (ORNL)
12:15–13:00	Fri-EMIC-14	Exhibit	Microsoft	Microsoft Quantum — Scheduled Exhibits
12:15–13:00	Fri-EKEY-14	Exhibit	Keysight	Keysight — Scheduled Exhibits
12:15–13:00	Fri-POS-14	Posters	Bison	Quantum Simulation 2 — Poster Session Chair: Andreas Bergen, engageLively Pos1: Teik Guan Tan and Jianying Zhou: Quantum Interpreted Circuits (QuIC): Rapidly Simulating Quantum Algorithms Pos2: Andrea Delgado and Travis Humble: Quantum Algorithms for Event Reconstruction and Simulation in High Energy Physics Experiments
12:15–13:00	Fri-BOF-14	BoF	Hawk	Quantum Science Centers ORNL & LANL BoF
12:15–13:00	Fri-NW1-14	Network	WiseOwl1	Networking Session — Meet Quantum Newcomers
12:15–13:00	Fri-NW2-14	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
12:15–13:00	Fri-COL-14	Break	Rockies	Relax in Beautiful Colorado — Hike the Rockies
13:00–13:30	Fri-QBM2-15	Papers	Bighorn1	QBM2 Session Chair: Joseph Emerson, Quantum Benchmark & University of Waterloo QBM2: Tristan Zaborniak and Rogério de Sousa, University of Victoria. In situ noise characterization of the D-Wave quantum annealer
13:30–14:00	Fri-QBM2-15	Papers	Bighorn1	QBM2: Samudra Dasgupta and Travis Humble, Oak Ridge National Laboratory. Characterizing the Stability of NISQ Devices
13:00–14:30	Fri-TUT-15	Tutorial	Bear1	Part 2: Cirq for NISQ: Research and Education—LaRose, Hoffman: Google AI Quantum
13:00–14:30	Fri-TUT-15	Tutorial	Bear2	Part 2: Serious Games for Quantum Computing—Lahmann, Heider: IBM Germany
13:00–14:30	Fri-TUT-15	Tutorial	Bear3	Part 2: Exploring the D-Wave Webinar Series—Gottlieb, D-Wave Systems
13:00–14:30	Fri-WKS-15	Workshop	Elk1	Part 2: Technology Roadmapping for Quantum Computing—Holmes, DeBenedictis: IEEE IRDS
13:00–14:30	Fri-WKS-15	Workshop	Elk2	Part 2: Control and Design of Superconducting Qubits—Bronn, Minev, Scholten: IBM Quantum
13:00–14:30	Fri-WKS-15	Workshop	Elk3	Part 2: Quantum Computing Entrepreneurship—Chen, Wong, Sotelo: TEMS Society & IEEE Entrepreneurship
13:00–14:30	Fri-WKS-15	Workshop	Elk4	Part 2: Quantum Simulation—Alexeev, Otten: Argonne National Laboratory; Mandrà, NASA Ames
13:00–14:30	Fri-WKS-15	Workshop	Elk5	Part 2: Quantum Computing Opportunities in Renewable Energy—Eldredge: U.S. Department of Energy; Giani: GE Research
14:30–15:15	Fri-EH-WE-16	Exhibits	Honeywell	Honeywell Quantum Solutions — Scheduled Exhibits
14:30–15:15	Fri-EQUA-16	Exhibits	Quantropi	Quantropi — Scheduled Exhibits
14:30–15:15	Fri-POS-16	Posters	Bison	Open Posters
14:30–15:15	Fri-BOF-16	BoF	Hawk	Scheduled BoF Session
14:30–15:15	Fri-NW1-16	Network	WiseOwl1	Networking Session — Meet Quantum Experts

MT (UTC-6)	Session Name	Session Type	Session Room	Friday Sessions
14:30–15:15	Fri-NW2-16	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
14:30–15:15	Fri-COL-16	Break	Rockies	Relax in Beautiful Colorado — Ski the Rockies
15:15–16:45	Fri-PAN-17	Panel	Moose	Enabling and Growing the Quantum Industry. Organizers: Joe Broz, SRI International & QED-C and Celia Merzbacher, SRI International & QED-C; Moderator: Tom Ohki, Raytheon BBN; Panelists: Ricardo Borges, Synopsys; Ashley Huff, Janis Research Company; Ofer Naaman, Google; Chad Hoyt, Honeywell. Session Chair: Candace Culhane, LANL.
15:15–16:45	Fri-TUT-17	Tutorial	Bear1	Part 3: Cirq for NISQ: Research and Education—LaRose, Hoffman: Google AI Quantum
15:15–16:45	Fri-TUT-17	Tutorial	Bear2	Part 3: Serious Games for Quantum Computing—Lahmann, Heider: IBM Germany
15:15–16:45	Fri-TUT-17	Tutorial	Bear3	Part 3: Exploring the D-Wave Webinar Series—Gottlieb, D-Wave Systems
15:15–16:45	Fri-WKS-17	Workshop	Elk1	Part 3: Technology Roadmapping for Quantum Computing—Holmes, DeBenedictis: IEEE IRDS
15:15–16:45	Fri-WKS-17	Workshop	Elk2	Part 3: Control and Design of Superconducting Qubits—Bronn, Minev, Scholten: IBM Quantum
15:15–16:45	Fri-WKS-17	Workshop	Elk3	Part 3: Quantum Computing Entrepreneurship—Chen, Wong, Sotelo: TEMS Society & IEEE Entrepreneurship
15:15–16:45	Fri-WKS-17	Workshop	Elk4	Part 3: Quantum Simulation—Alexeev, Otten: Argonne National Laboratory; Mandrà, NASA Ames
15:15–16:45	Fri-WKS-17	Workshop	Elk5	Part 3: Quantum Computing Opportunities in Renewable Energy—Eldredge: U.S. Department of Energy; Giani: GE Research
16:45–17:30	Fri-EX-OP-18	Exhibits	Patrons	Open Exhibits
16:45–17:30	Fri-POS-18	Posters	Bison	Open Posters
16:45–17:30	Fri-BOF-18	BoF	Hawk	Open BoF Session
16:45–17:30	Fri-NW1-18	Network	WiseOwl1	Networking Session — Meet Quantum Experts
16:45–17:30	Fri-NW2-18	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
16:45–17:30	Fri-COL-18	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature
17:30–19:00	Fri-KEY-19	Keynote	Eagle	Announcements, Awards, Keynote: Alexander Condello, D-Wave Systems—Practical Quantum Computing with D-Wave. Session Chair: Hausi Müller, Univ. of Victoria
19:00–19:45	Fri-KEY-20	Network	Eagle	Hang out with Keynote Speaker Alexander Condello
19:00–19:45	Fri-EX-OP-20	Exhibits	Patrons	Open Exhibits
19:00–19:45	Fri-PO-SO20	Posters	Bison	Open Posters
19:00–19:45	Fri-BOFO-20	BoF	Hawk	Open BoF Session
19:00–19:45	Fri-NW1-20	Network	WiseOwl1	Networking Session — Meet Quantum Experts
19:00–19:45	Fri-NW2-20	Network	WiseOwl2	Networking Session — Meet Quantum Enthusiasts
19:00–19:45	Fri-COL-20	Break	Rockies	Relax in Beautiful Colorado — Enjoy Nature

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