Saturday, January 14:

All tutorials will take place at the Cascade Foyer North room located on the second floor of the Westin.

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>9:30-10:30</td>
<td>Steve Flammia: Debugging the next generation of quantum devices (I)</td>
</tr>
<tr>
<td>10:30-11:00</td>
<td>Coffee break</td>
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<tr>
<td>11:00-12:00</td>
<td>Steve Flammia: Debugging the next generation of quantum devices (II)</td>
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<tr>
<td>12:00-2:00</td>
<td>Lunch break</td>
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<tr>
<td>2:00-3:00</td>
<td>Lídia del Rio: Quantum thermodynamics (I)</td>
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<td>3:00-3:30</td>
<td>Coffee break</td>
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<tr>
<td>3:30-4:30</td>
<td>Lídia del Rio: Quantum thermodynamics (II)</td>
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Sunday, January 15:

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>9:30-10:30</td>
<td>Norbert Schuch: Matrix product states and tensor networks (I)</td>
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<tr>
<td>10:30-11:00</td>
<td>Coffee break</td>
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<tr>
<td>2:00-3:00</td>
<td>John Preskill: Quantum information and spacetime (I)</td>
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<td>3:00-3:30</td>
<td>Coffee break</td>
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<tr>
<td>3:30-4:30</td>
<td>John Preskill: Quantum information and spacetime (II)</td>
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</tbody>
</table>

Conference registration will be open during the tutorials on Saturday and Sunday on the second floor of the Westin. During the conference, registration will be open on the fourth floor.

Monday, January 16:

All talks will take place at the Grand Ballroom located on the fourth floor of the Westin.

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>8:00-8:45</td>
<td>Registration</td>
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<tr>
<td>8:45-9:00</td>
<td>Welcoming address</td>
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<tr>
<td>9:00-10:00</td>
<td>Plenary talk I: (Grand Ballroom I + II, Chair: Fang Song)</td>
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<tr>
<td></td>
<td>Quantum homomorphic encryption for polynomial-sized circuits (Best Student Paper)</td>
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<td></td>
<td>Yfke Dulek, Christian Schaffner, and Florian Speelman</td>
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<tr>
<td>10:00-10:30</td>
<td>Coffee break</td>
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<tr>
<td>10:30-12:30</td>
<td>Parallel session I-A: (Grand Ballroom I, Chair: André Chailloux)</td>
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<tr>
<td>10:30-11:10</td>
<td>Zero-knowledge proof systems for QMA</td>
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<td></td>
<td>Anne Broadbent, Zhengfeng Ji, Fang Song, and John Watrous</td>
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<tr>
<td>11:10-11:50</td>
<td>Compression of quantum multi-prover interactive proofs</td>
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<td>Zhengfeng Ji</td>
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<tr>
<td>11:50-12:30</td>
<td>Sequential measurements, disturbance and property testing</td>
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<td>Aram Harrow, Cedric Lin, and Ashley Montanaro</td>
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<tr>
<td>10:30-12:30</td>
<td>Parallel session I-B: (Grand Ballroom II, Chair: David Poulin)</td>
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<tr>
<td>10:30-11:10</td>
<td>Unifying gate-synthesis and magic state distillation</td>
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<td>Earl Campbell and Mark Howard</td>
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<tr>
<td>11:10-11:50</td>
<td>Application of a resource theory for magic states to fault-tolerant quantum computing</td>
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<tr>
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<td>Mark Howard and Earl Campbell</td>
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<tr>
<td>11:50-12:30</td>
<td>Time-correlated noise in quantum computation</td>
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<td>Héctor Bombin</td>
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</tbody>
</table>
12:30-2:00  Lunch break

2:00-3:20  **Parallel session II-A: (Grand Ballroom I, Chair: Jérémie Roland)**
Separations in communication complexity using cheat sheets and information complexity
Anurag Anshu, Aleksandrs Belovs, Shalev Ben-David, Mika Göös, Rahul Jain, Robin Kothari, Troy Lee, and Miklos Santha

2:40-3:20  **Information-theoretic tools for interactive quantum protocols, and applications: flow of information, augmented index, and DYCK(2)**
Mathieu Laurière, Ashwin Nayak, and Dave Touchette

2:00-3:20  **Parallel session II-B: (Grand Ballroom II, Chair: Karol Horodecki)**
Energy as a detector of nonlocality of many-body spin systems
Jordi Tura Brugués, Gemma de Las Cuevas, Remigiusz Augusiak, Maciej Lewenstein, Antonio Acín, and Ignacio Cirac

2:40-3:20  **A resource theory for work and heat**
Carlo Sparaciari, Jonathan Oppenheim, and Tobias Fritz

3:20-3:50  Coffee break + mentor sessions (sign up for mentoring using available sheets)

3:50-4:50  **Plenary talk II: (Grand Ballroom I + II, Chair: Andrew Doherty)**
The entanglement of distillation for gauge theories
Karel Van Acoleyen, Volkher Scholz, Michael Marien, Nick Bultinck, Jutho Haegemen, and Frank Verstraete

4:50-6:30  **Poster session I: (Grand Ballroom III)**
Hors d’Oeuvres and drinks will be provided. Vote for best poster using the tickets in your badge!

8:00-9:30  **Software demo I: (Grand Ballroom I + II)**
Will Zeng: Rigetti Computing

Tuesday, January 17:

9:00-10:00  **Invited talk I: (Grand Ballroom I + II, Chair: Peter Shor)**
Simulating quantum systems on classical computers
Garnet Chan

10:00-10:30  Coffee break

10:30-12:30  **Parallel session III-A: (Grand Ballroom I, Chair: Aram Harrow)**
Quantum speed-ups for semidefinite programming
Fernando Brandao and Krysta Svore

11:10-11:50  Quantum recommendation systems
Iordanis Kerenidis and Anupam Prakash

11:50-12:30  A complete characterization of unitary quantum space
Bill Fefferman and Cedric Yen-Yu Lin

10:30-12:30  **Parallel session III-B: (Grand Ballroom II, Chair: Todd Brun)**
Belief propagation decoding of quantum channels by passing quantum messages
Joseph M. Renes

11:10-11:50  Biunitary constructions in quantum information
David Reutter and Jamie Vicary

11:50-12:30  Catalytic Decoupling
Christian Majenz, Mario Berta, Frédéric Dupuis, Renato Renner, and Matthias Christandl
merged with: Deconstruction and conditional erasure of quantum correlations
Mario Berta, Fernando Brandao, Christian Majenz, and Mark Wilde
12:30-2:00  Lunch break

2:00-3:20  Parallel session IV-A: (Grand Ballroom I, Chair: Xiaodi Wu)
Asymptotic entanglement manipulation under PPT operations: new SDP bounds and irreversibility: Xin Wang and Runyao Duan

2:40-3:20  Operator scaling and applications
Ankit Garg, Leonid Gurvits, Rafael Oliveira, and Avi Wigderson

2:00-3:20  Parallel session IV-B: (Grand Ballroom II, Chair: Miklos Santha)

2:00-2:40  Optimal quantum sample complexity of learning algorithms
Srinivasan Arunachalam and Ronald de Wolf

2:40-3:20  Operator scaling and applications
Ankit Garg, Leonid Gurvits, Rafael Oliveira, and Avi Wigderson

3:20-3:50  Coffee break + mentor sessions (sign up for mentoring using available sheets)

3:50-4:50  Invited talk II: (Grand Ballroom I + II, Chair: Jonathan Oppenheim)
Racing classical computers with quantum boson-sampling machines
Chaoyang Lu

4:50-6:30  Poster session II: (Grand Ballroom III)
Hors d’Oeuvres and drinks will be provided. Vote for best poster using the tickets in your badge!

8:00-9:30  Software demo II: (Grand Ballroom I + II)
Dave Wecker: Microsoft LIQUi|>

Wednesday, January 18:

9:00-10:00  Plenary talk III: (Grand Ballroom I + II, Chair: Fernando Brandao)
From quantum thermodynamical identities to a second law equality
Alvaro Alhambra, Jonathan Oppenheim, Chris Perry, and Lluis Masanes

10:00  Group photo
Follow the crowd! We’d love to have you in that picture!

10:00-10:20  Coffee break

10:20-11:40  Parallel session V-A: (Grand Ballroom I, Chair: Robert Raussendorf)
Fault-tolerant error correction for non-abelian anyons
Guillaume Dauphinais and David Poulin

11:00-11:40  Anyons and matrix product operator algebras
Nick Bultinck, Michael Marien, Dominic Williamson, Mehmet Burak Sahinoglu, Jutho Haegeman, and Frank Verstraete

10:20-11:40  Parallel session V-B: (Grand Ballroom II, Chair: Thomas Vidick)
A parallel repetition theorem for all entangled games
Henry Yuen

11:00-11:40  Limitations of semidefinite programs for separable states and entangled games
Aram Harrow, Anand Natarajan, and Xiaodi Wu

11:40-12:00  Coffee break
12:00-1:20  Parallel session VI-A: (Grand Ballroom I, Chair: Omar Fawzi)
  12:00-12:40 Applications of recoverability in quantum information
      Alvaro Alhambra, Mario Berta, Francesco Buscemi, Siddhartha Das, Marius Lemm, Seth Lloyd, Iman Marvian, Mark Wilde, Stephanie Wehner, and Mischa Woods
  12:40-1:20 Multivariate trace inequalities
      David Sutter, Mario Berta, and Marco Tomamichel

12:00-1:20  Parallel session VI-B: (Grand Ballroom II, Chair: Robin Kothari)
  12:00-12:40 A polynomial time quantum algorithm for computing class groups and solving the principal ideal problem in arbitrary degree number fields
      Jean-Francois Biasse and Fang Song
  12:40-1:20 Sculpting quantum speedups
      Scott Aaronson and Shalev Ben-David

1:20-6:30  Free afternoon
Explore Seattle on your own or join one of the organized excursions by the QuArC team.

6:30-9:30  Conference dinner
At the Grand Ballroom on the fourth floor.

Thursday, January 19:

9:00-10:00  Invited talk III: (Grand Ballroom I + II, Chair: Krysta Svore)
  Spectrahedral lifts and quantum learning
      James Lee

10:00-10:30  Coffee break

10:30-12:30  Parallel session VII-A: (Grand Ballroom I, Chair: David Gosset)
  10:30-11:10 Simulated quantum annealing can be exponentially faster than classical simulated annealing
      Elizabeth Crosson and Aram Harrow
  merged with: Adiabatic optimization versus diffusion Monte Carlo
      Michael Jarret, Stephen Jordan, and Brad Lackey
  11:10-11:50 Optimal Hamiltonian simulation by quantum signal processing
      Guang Hao Low and Isaac Chuang
  11:50-12:30 Rigorous RG algorithms and area laws for low energy eigenstates in 1D
      Itai Arad, Zeph Landau, Umesh Vazirani, and Thomas Vidick

10:30-12:30  Parallel session VII-B: (Grand Ballroom II, Chair: Mark Wilde)
  10:30-11:10 Round complexity in the local transformations of quantum and classical state
      Eric Chitambar and Min-Hsiu Hsieh
  11:10-11:50 Optimal compression for identically prepared qubit states
      Yuxiang Yang, Giulio Chiribella, and Masahito Hayashi
  11:50-12:30 Free time

12:30-2:00  Business lunch (Grand Ballroom I + II)
Boxed lunches will be provided

2:00-3:20  Parallel session VIII-A: (Grand Ballroom I, Chair: Nathan Wiebe)
  2:00-2:40 Universal quantum Hamiltonians
      Toby Cubitt, Ashley Montanaro, and Stephen Piddock
  2:40-3:20 Complexity of quantum impurity problems
      Sergey Bravyi and David Gosset

3:20-4:00  On preparing ground states of gapped Hamiltonians: an efficient quantum Lovász local lemma
      Andras Gilyen and Or Sattath
2:00-3:20  **Parallel session VIII-B: (Grand Ballroom II, Chair: Anthony Leverrier)**

2:00-2:40  *Robust self-testing of many qubit states*
Anand Natarajan and Thomas Vidick

2:40-3:20  *Overlapping qubits*
Rui Chao, Ben Reichardt, Chris Sutherland and Thomas Vidick
merged with: *Parallel self-testing of (tilted) EPR pairs via copies of (tilted) CHSH*
Andrea W. Coladangelo
merged with: *The parallel-repeated magic square game is rigid*
Matthew Coudron and Anand Natarajan

3:20-4:00  *General randomness amplification with non-signaling security*
Kai-Min Chung, Yaoyun Shi, and Xiaodi Wu

4:00-4:30  **Coffee break + mentor sessions** (sign up for mentoring using available sheets)

4:30-5:30  **Plenary talk IV: (Grand Ballroom I + II, Chair: Joseph Renes)**

*Entropy accumulation in device-independent protocols*
Rotem Arnon-Friedman, Frédéric Dupuis, Omar Fawzi, Renato Renner, and Thomas Vidick

5:30-7:00  **Free time**
Time for a quick dinner and for transitioning to the Seattle Aquarium

7:30-10:30  **Rump session at the Seattle Aquarium**
Please submit your rump talk suggestions to Vadym Kliuchnikov! (vadym@microsoft.com)

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**Friday, January 20:**

9:00-10:00  **Plenary talk V: (Grand Ballroom I + II, Chair: Andris Ambainis)**

*Tsirelson’s problem and an embedding theorem for groups arising from non-local games*
William Slofstra

10:00-10:30  **Coffee break**

10:30-12:30  **Parallel session IX-A: (Grand Ballroom I, Chair: Martin Roetteler)**

10:30-11:10  *Characterizing quantum supremacy in near-term devices*
Sergio Boixo, Sergei Isakov, Vadim Smelyanskiy, Ryan Babbush, Nan Ding, Zhang Jiang, Michael Bremner, John Martinis, and Hartmut Neven

11:10-11:50  *Threshold theorem for quantum supremacy*
Keisuke Fujii

11:50-12:30  *Improved classical simulation of quantum circuits dominated by Clifford gates*
Sergey Bravyi and David Gosset

10:30-12:30  **Parallel session IX-B: (Grand Ballroom II, Chair: Stephen Bartlett)**

10:30-11:10  *Gaussian optimizers in quantum information*
Giacomo De Palma, Dario Trevisan, and Vittorio Giovannetti

11:10-11:50  *SU(p,q) coherent states and Gaussian de Finetti theorems*
Anthony Leverrier

11:50-12:30  *Geometric inequalities and contractivity of bosonic semigroups*
Nilanjana Datta, Stefan Huber, Robert König, Yan Pautrat, Cambyse Rouzé, and Anna Vershynina
12:30-2:00 Lunch

2:00-3:20 Parallel session X-A: (Grand Ballroom I, Chair: Min-Hsiu Hsieh)
- Two-way assisted capacities for quantum and private communication
  Stefano Pirandola, Riccardo Laurenza, Carlo Ottaviani, and Leonardo Banchi
  *merged with: Converse bounds for private communication over quantum channels*
  Mark Wilde, Marco Tomamichel, and Mario Berta

2:00-2:40 Two-way assisted capacities for quantum and private communication
  Stefano Pirandola, Riccardo Laurenza, Carlo Ottaviani, and Leonardo Banchi

2:40-3:20 Capacity estimates for TRO channels
  Li Gao, Marius Junge, and Nicholas Laracuente

3:20-4:00 Semidefinite programming strong converse bounds for quantum channel capacities
  Xin Wang, Wei Xie and Runyao Duan

2:00-3:20 Parallel session X-B: (Grand Ballroom II, Chair: Matthew Hastings)
- Finite correlation length implies efficient preparation of quantum thermal states
  Michael Kastoryano and Fernando Brandao

2:00-2:40 Finite correlation length implies efficient preparation of quantum thermal states
  Michael Kastoryano and Fernando Brandao

2:40-3:20 The thermality of quantum approximate Markov chains, with implications to the locality of edge states and entanglement spectrum
  Kohtaro Kato and Fernando Brandao

3:20-4:00 Symmetry protected topological order at nonzero temperature
  Sam Roberts, Beni Yoshida, Aleksander Kubica, and Stephen Bartlett

4:00-4:30 Coffee break + mentor sessions (sign up for mentoring using available sheets)

4:30-5:30 Plenary talk VI: (Grand Ballroom I + II, Chair: Ronald de Wolf)
- Exponential separation between quantum communication complexity and classical information complexity: Anurag Anshu, Dave Touchette, Penghui Yao, and Nengkun Yu

5:30 Closing

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**Wireless access:** Network name = Westin-Meeting, Password = quantum17

**Twitter feed:** Please add #QIP2017 to your posts and picture updates!

**Disclaimer:** Speaker assignments are indicated by an underscored name. Unless requested differently by the authors, by default the first registered individual in the author list was assigned to be speaker. If a merged talk indicates more than one assigned speaker, the allotted time will be split equally among the presenters.