Quantum Information Processing (QIP 2017)
Westin, Seattle, Washington, U.S.A.
January 14-20, 2017

Saturday, January 14:

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

9:30-10:30	Steve Flammia: *Debugging the next generation of quantum devices (I)*
10:30-11:00	**Coffee break**
11:00-12:00	Steve Flammia: *Debugging the next generation of quantum devices (II)*
12:00-2:00	**Lunch break**
2:00-3:00	Lídia del Rio: *Quantum thermodynamics (I)*
3:00-3:30	**Coffee break**
3:30-4:30	Lídia del Rio: *Quantum thermodynamics (II)*

Sunday, January 15:

9:30-10:30	Norbert Schuch: *Matrix product states and tensor networks (I)*
10:30-11:00	**Coffee break**
11:00-12:00	Norbert Schuch: *Matrix product states and tensor networks (II)*
12:00-2:00	**Lunch break**
2:00-3:00	John Preskill: *Quantum information and spacetime (I)*
3:00-3:30	**Coffee break**
3:30-4:30	John Preskill: *Quantum information and spacetime (II)*

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.

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

12:30-2:00	**Lunch break**

2:00-3:20 **Parallel session II-A: (Grand Ballroom I, Chair: Jérémie Roland)**
2:00-2:40 *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)**
2:00-2:40 *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)**
10:30-11:10 *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)**
10:30-11:10 *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)**
2:00-2:40   *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   *Efficient quantum walk on the grid with multiple marked elements*
Peter Høyer and Mojtaba Komeili
merged with: Controlled quantum amplification
Cătălin Dohotaru and Peter Høyer

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)**
10:20-11:00   *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)**
10:20-11:00   *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 <u>Mischa Woods</u>

12:40-1:20   *Multivariate trace inequalities*
<u>David Sutter</u>, 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*
<u>Jean-Francois Biasse</u> and Fang Song

12:40-1:20   *Sculpting quantum speedups*
Scott Aaronson and <u>Shalev Ben-David</u>

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.

<u>**Thursday, January 19:**</u>

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

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*
<u>Elizabeth Crosson</u> and Aram Harrow
merged with: Adiabatic optimization versus diffusion Monte Carlo
<u>Michael Jarret</u>, Stephen Jordan, and Brad Lackey

11:10-11:50   *Optimal Hamiltonian simulation by quantum signal processing*
<u>Guang Hao Low</u> 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 <u>Thomas Vidick</u>

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*
<u>Eric Chitambar</u> and Min-Hsiu Hsieh

11:10-11:50   *Optimal compression for identically prepared qubit states*
Yuxiang Yang, <u>Giulio Chiribella</u>, 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 <u>Stephen Piddock</u>

2:40-3:20   *Complexity of quantum impurity problems*
Sergey Bravyi and <u>David Gosset</u>

3:20-4:00   *On preparing ground states of gapped Hamiltonians: an efficient quantum Lovász local lemma*
<u>Andras Gilyen</u> 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*
<u>Anand Natarajan</u> and Thomas Vidick
2:40-3:20 *Overlapping qubits*
<u>Rui Chao</u>, Ben Reichardt, Chris Sutherland and Thomas Vidick
merged with: Parallel self-testing of (tilted) EPR pairs via copies of (tilted) CHSH
<u>Andrea W. Coladangelo</u>
merged with: The parallel-repeated magic square game is rigid
<u>Matthew Coudron</u> and Anand Natarajan
3:20-4:00 *General randomness amplification with non-signaling security*
<u>Kai-Min Chung</u>, 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
<u>Rotem Arnon-Friedman</u>, 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)

<u>**Friday, January 20:**</u>

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
<u>William Slofstra</u>

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*
<u>Sergio Boixo</u>, 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*
<u>Keisuke Fujii</u>
11:50-12:30 *Improved classical simulation of quantum circuits dominated by Clifford gates*
<u>Sergey Bravyi</u> 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*
<u>Giacomo De Palma</u>, Dario Trevisan, and Vittorio Giovannetti
11:10-11:50 *SU(p,q) coherent states and Gaussian de Finetti theorems*
<u>Anthony Leverrier</u>
11:50-12:30 *Geometric inequalities and contractivity of bosonic semigroups*
Nilanjana Datta, Stefan Huber, Robert König, Yan Pautrat, Cambyse Rouzé, and <u>Anna Vershynina</u>

12:30-2:00	**Lunch**

2:00-3:20 **Parallel session X-A: (Grand Ballroom I, Chair: Min-Hsiu Hsieh)**
2:00-2:40 *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
2:40-3:20 *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)**
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**

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.