# QIP 2009 PROGRAM

## SUNDAY JANUARY 11, 2009

3:00-6:00 p.m. Early Registration (La Fonda Hotel – Main lobby)

## MONDAY JANUARY 12, 2009

7:30-8:30 a.m. Registration at the Santa Fe Convention Center

8:30-9:00 a.m. Opening Remarks

9:00-9:55 a.m. Matt Hastings, Invited Speaker
*A counter-example to additivity*

10:00-10:30 a.m. Patrick Hayden and Andreas Winter
*The fidelity alternative and quantum measurement simulation*

**10:30-11:05 Break**

11:05-11:35 a.m. Sergey Bravyi and Barbara Terhal
*A no-go theorem for a two-dimensional self-correcting quantum memory based on stabilizer codes*

11:40-12:00 p.m. Dmitry Gavinsky
*Predictive quantum learning*

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

2:00-2:55 p.m. Graeme Smith, Invited Speaker
*Quantum communication with zero-capacity channels*

3:00-3:20 p.m. John Smolin and Graeme Smith
*Can non-private channels transmit quantum information?*

**3:20-3:50 Break**

3:50-4:10 p.m. Ashley Montanaro and Tobias Osbourne
*Quantum Boolean functions*

4:15-4:35 p.m. Yi-Kai Liu
*Quantum algorithms using the curvelet transform*

4:40-5:00 p.m. Dave Bacon, Wim van Dam, and Alexander Russell
*Analyzing quantum circuits using the least action principle*

# TUESDAY JANUARY 13, 2009

8:30-9:00 a.m. Registration at the Santa Fe Convention Center

9:00-9:55 a.m. Avinatan Hassidim, Invited Speaker
*Multi-prover interactive proofs with communicating provers*

10:00-10:30 a.m. Andris Ambainis
*Quantum algorithms are at most polynomially faster than classical for any symmetric function*

**10:30-11:05 Break**

11:05-11:35 a.m. Jean-Pierre Tillich
*Quantum tornado codes*

11:40-12:00 p.m. Norbert Schuch and Frank Verstraete
*Interacting electrons, density functional theory, and quantum Merlin-Arthur*

**Tuesday afternoon: Free. (Explore! Collaborate! Enjoy!)**

[This space is reserved for creative doodling.]

## WEDNESDAY JANUARY 14, 2009

8:30-9:00 a.m. Registration at the Santa Fe Convention Center

9:00-9:55 a.m. Andrew Childs, Invited Speaker
*Universal computation by quantum walk*

10:00-10:30 a.m. Richard Cleve, Daniel Gottesman, Michele Mosca, Rolando Somma, and David Yonge-Mallo
*Efficient discrete-time simulations of continuous-time quantum query algorithms*

**10:30-11:05 Break**

11:05-11:35 a.m. Dmitry Gavinsky
*Classical interaction cannot replace quantum nonlocality*

11:40-12:00 p.m. Tsuyoshi Ito, Hirotada Kobayashi, and Keiji Matsumoto
*Oracularization and two-prover one-round interactive proofs against nonlocal strategies*

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

2:00-2:20 p.m. Panos Aliferis and John Preskill
*Fault-tolerant quantum computing against highly biased noise*

2:25-2:45 p.m. Bryan Eastin and Emanuel Knill
*Restrictions on transversal encoded quantum gate sets*

2:50-3:10 p.m. Avraham Ben-Aroya and Amnon Ta-Shma
*Approximate quantum error correction for correlated noise*

3:15-3:20 p.m. Dmitry Maslov (Program Director, AF/CCF/CISE at NSF)
*Quantum information funding at the National Science Foundation*

**3:20-3:30 Break**

3:30-6:00 p.m. Poster Session

## THURSDAY JANUARY 15, 2009

8:30-9:00 a.m. Registration at the Santa Fe Convention Center

9:00-9:55 a.m. Charles Marcus, Invited Speaker
*Holding quantum information in electron spins*

10:00-10:30 a.m. Sandy Irani
*Ground states entanglement in one-dimensional translationally-invariant quantum systems*

**10:30-11:05 Break**

11:05-11:35 a.m. Fernando Brandao and Martin Plenio
*Quantum Stein's lemma for correlated states and asymptotic entanglement transformations*

11:40-12:00 p.m. Steve Flammia, David Gross, Jens Eisert, Michael Bremner, Andreas Winter, and Caterina Mora
*Most quantum states are useless for measurement-based quantum computation*

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

2:00-2:55 p.m. Matt Hastings, Invited Speaker
*Area laws for quantum many-body systems: Gapped one-dimensional systems are in NP*

3:00-3:20 p.m. Norbert Schuch, J. Ignacio Cirac, and Frank Verstraete
*The computational difficulty of finding MPS ground states*

**3:20-3:50 Break**

3:50-4:10 p.m. Dan Shepherd and Michael Bremner
*Instantaneous quantum computation*

4:15-4:35 p.m. Jens Eisert and David Gross
*Lieb-Robinson bounds and "supersonic quantum communication"*

4:40-5:00 p.m. Scott Aaronson and John Watrous
*Closed timelike curves make quantum and classical computing equivalent*

**5:00-6:00 Free**

**6:00-8:00 p.m. Banquet at La Fonda (Informal talk by Michael Nielsen)**

# FRIDAY JANUARY 16, 2009

8:30-9:00 a.m. Registration at the Santa Fe Convention Center

9:00-9:55 a.m. Lluis Masanes, Invited Speaker
*Towards device-independent security in QKD*

10:00-10:30 a.m. Amnon Ta-Shma
*Short seed extractors against quantum storage*

**10:30-11:05 Break**

11:05-11:35 a.m. Jop Briet, Harry Buhrman, and Ben Toner
*A generalized Grothendieck inequality and entanglement in XOR games*

11:40-12:00 p.m. Dejan Dukaric, Manuel Forster, Severin Winkler, and Stefan Wolf
*On non-locality distillation*

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

2:00-2:20 p.m. Gilles Brassard, Louis Salvail, and Alain Tapp
*Key distribution and oblivious transfer à la Merkle*

2:25-2:45 p.m. Robert König, Renato Renner, and Christian Schaffner
*The operational meaning of min- and max-entropy*

2:50-3:10 p.m. Matthias Christandl, Dejan Dukaric, Robert König, and Renato Renner
*Postselection-technique with applications to quantum cryptography and the parallel repetition problem*

**3:10-3:50 Break**

3:50-4:10 p.m. Robert König, Ben Reichardt, and Guifre Vidal
*Exact entanglement renormalization for string-net models*

4:15-4:35 p.m. Aram Harrow and Richard Low
*Efficient quantum tensor product expanders and k-designs*

4:40-5:00 p.m. Bill Rosgen
*Distinguishability of random unitary channels*