Vincent Russo

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Research Interests

Quantum Computation & Quantum Information, Quantum Complexity, Software Engineering, Theoretical Computer Science, Semidefinite Programming.

Education

- Ph.D. Computer Science (Quantum Information), University of Waterloo 2012 (in progress).
  Advisors: Michelle Mosca and John Watrous
- M.Sc. Computer Science, Wayne State University 2011.
- B.Sc. Computer Science, Wayne State University 2010.

Professional and Research Experience

- *Raytheon BBN Technologies (Internship): 06/12 - 09/12*,
  Performed research on quantum compilers and quantum programming languages. BBN Technologies, Cambridge, MA, USA.
- *Institute for Quantum Computing (Visiting Researcher): 07/11 - 08/11*,
  Performed research at the Institute for Quantum Computing with John Watrous on quantum complexity theory. University of Waterloo, Ontario, Canada.
- *University of Michigan Aerospace Engineering (Research Assistant): 05/10 - 09/10*,
  Performed analysis on the MESSENGER spacecraft. Space Physics Research Lab, University of Michigan, Ann Arbor, USA.
- *Graduate Research Assistant: 11/10 - 11/11*,
  Molecular dynamics simulations on graphics processing units. Early contributor to GPU Optimized Monte Carlo (GOMC), an open-source Gibbs ensemble Monte Carlo simulation engine. Wayne State University, Detroit, USA.
- *Graduate Research Assistant: 11/10 - 11/11*,
  Experimental computational methods for preventing hypertension. Wayne State University, Detroit, USA.
- *Undergraduate Research Assistant: 05/08 - 05/09*,
  Scientific cloud computing techniques. Wayne State University, Detroit, USA.

Publications

Refereed Journal Publications and Preprints

1. Somshubhro Bandypadhyay, Alessandro Cosentino, Nathaniel Johnston, **Vincent Russo** John Watrous, Nengkun Yu, "Limitations on Separable Measurements from Cone Programming", *arXiv preprint:1408.6981*, (2014).

2. Srinivasan Arunachalam, Nathaniel Johnston, and **Vincent Russo**, "Is Absolute Separability Determined by the Partial Transpose?", *arXiv preprint:1405.5853*, (2014).

3. Srinivasan Arunachalam, Abel Molina, and **Vincent Russo**, "Quantum Hedging in Two-round Prover-verifier Interactions", *arXiv preprint:1310.7954*, (2013).

4. David Gosset, Vadym Kliuchnikov, Michelle Mosca, and **Vincent Russo**, "An Algorithm for the T-count", *arXiv preprint:1308.4134*, (2013).

5. Alessandro Cosentino and **Vincent Russo**, "Small Sets of Locally Indistinguishable Orthogonal Maximally Entangled States", *arXiv prepint:arXiv:1307.3232*, (2013).

6. Jason Mick, Eyad Hailat, **Vincent Russo**, Kamel Rushaidat, Loren Schwiebert, Jeffrey Potoff, "GPU-Accelerated Gibbs Ensemble Monte Carlo Simulations of Lennard-Jonesium", *Computer Physics Communications*, (2013).

7. Eyad Hailat, Jason Mick, **Vincent Russo**, Kamel Rushaidat, Loren Schwiebert, Jeffrey Potoff "Parallel Monte Carlo Simulation for the Canonical Ensemble on the GPU", *Journal of Parallel and Distributed Computing* (2012)

8. **Vincent Russo**, Loren Schwiebert, "Beatty Sequences, Fibonacci Sequences, and the Golden Ratio", *Fibonacci Quarterly* **49**, 151–154 (2011)

Proceedings

1. Jason Mick, Jeffrey Potoff, Eyad Hailat, **Vincent Russo**, Loren Schwiebert, "GPUs for Lennard-Jones and Gibbs Ensemble Monte Carlo Particle Simulations", *GPU Technology Conference (GTC)*, Spring 2012

2. Jason Mick, Jeffrey Potoff, Eyad Hailat, **Vincent Russo**, Loren Schwiebert, "GPU Accelerated Monte Carlo Simulations in the Gibbs and Canonical Ensembles", *AIChE*, (2011).

3. Jason Mick, Jeffrey Potoff, Eyad Hailat, **Vincent Russo**, Kamel Rushaidat, Loren Schwiebert, "GPU Accelerated Configurational Bias Monte Carlo Simulations of Linear Alkanes", *AIChE*, (2012).

4. Jason Mick, Jeffrey Potoff, Eyad Hailat, **Vincent Russo**, Kamel Rushaidat, Loren Schwiebert, "Optimization of a Lennard-Jones Particle Monte Carlo GPU-Code", *AIChE*, (2012).

5. Jason Mick, Jeffrey Potoff, Eyad Hailat, **Vincent Russo**, Kamel Rushaidat, Loren Schwiebert, "GPU MCMC Developments: CBMC Nonpolar Molecules, Verlet Lists, and Architectural Optimizations", *AIChE*, (2012).

Technical Reports

- **Vincent Russo**, "Solar Wind Anomalies as Detected by the Fast Imaging Plasma Spectrometer", *University of Michigan*, Space Physics Lab, (2010).

Presentations

- *"Quantum Hedging in Two-round Prover-verifier Interactions"*, poster session, QIP 2013
- "*Small Sets of Locally Indistinguishable Orthogonal Maximally Entangled States*", poster session, QIP 2013.
- *"An Algorithm for the T-count"*, poster session, QIP 2013.
- *"GPU MCMC Developments: CBMC Nonpolar Molecules, Verlet Lists, and Architectural Optimizations"*, AIChE, 2012.
- *"GPU-Based Monte Carlo Simulations For Canonical and Gibbs Ensembles"*, NVIDIA GTC, 2012.
- *"Hyperbits"* (based on work by A. Winter et. al), University of Michigan, 2011
- *"Analysis of Nonlocal Games, Strategies, and Near-Optimal Bell Inequality Violations"* (based on work by H. Burhman et. al), University of Michigan, 2011

Workshops

- *Quantum Key Distribution Summer Workshop*, 2011, University of Waterloo - Institute for Quantum Computing

Technical Skills

Language / Development Proficiency

- Languages: C/C++/C#, F#, R, Java, Python, Fortran, MATLAB, Mathematica, Maple, Haskell, IDL, LaTeX
- Operating Systems: Unix/Linux, Windows.

Selected Software

- GOMC (GPU Optimized Monte Carlo)
  - Contributor to open-source GPU-driven molecular dynamic simulation software package. Written in C++ using the CUDA library.
- ToQITo (Theory of Quantum Information Toolkit)
  - Library of MATLAB functions for quantum information.
- Bitbucket and Github Repositories ((https://bitbucket.org/vprusso) and (https://github.com/vprusso))
  - Various open-source software related to papers, scientific computing, and other miscellaneous projects

Honors & Awards

- *International Doctoral Student Award*, University of Waterloo, 2012.
- *Mathematics Graduate Experience Award*, University of Waterloo, 2012.
- *Institute for Quantum Computing Entrance Award*, University of Waterloo, 2012.
- *David R. Cheriton Graduate Scholarship*, University of Waterloo, 2012.
- *Graduate Professional Scholarship*, Wayne State University, 2011 (Full year tuition scholarship)
- *IT Communities of Practice Award*, General Motors, 2010
- *IT Communities of Practice Award*, National Science Foundation, 2009

Teaching Experience

- CS 436 *Networks and Distributed Computer Systems*, TA, 2015.
- CS 343 *Concurrent and Parallel Programming*, TA, 2013-2014.
- CS 137 *Programming Principles*, TA, Fall 2012.
- CSC 1501 *Discrete Mathematics*, GTA, Winter 2012.
- CSC 1000 *Introduction to Computer Science*, GTA, Winter 2012.
- CSC 2101 *Data Structures and Algorithms*, GTA, Fall 2011.
- CSC 1101, *Problem Solving and Programming*, GTA Winter 2011.
- Intern Researcher, Space Physics Research Lab, University of Michigan 2010.
- Tutor, *All computer science and mathematics undergraduate courses*, Fall 2009-2012.
- Researcher, Department of Computer Science Wayne State University, 2008–2012.

Languages

- English (fluent)
- Spanish (intermediate)
- Japanese (intermediate)

Reference

John Watrous (Advisor, Professor)

- School of Computer Science
  University of Waterloo
  200 University Avenue West
  Waterloo, Ontario
  Canada N2L 3G1

Michele Mosca (Advisor, Professor, Canada Research Chair)

- Department of Combinatorics & Optimization,
  University of Waterloo
  200 University Avenue West
  Waterloo, Ontario
  Canada N2L 3G1

More available upon request.