

OLIVIA DI MATTEO

PhD candidate, Dept. of Physics and Astronomy, Institute for Quantum Computing
University of Waterloo
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EDUCATION

Graduate

PhD Physics (Quantum Information), anticipated late 2018
University of Waterloo, Waterloo ON

MSc Physics (Quantum Information), 2015
University of Waterloo, Waterloo ON

Undergraduate

Honours BSc, Mathematical Physics, 2013
Lakehead University, Thunder Bay ON

Other

ARCT, Piano Performance, 2010
Royal Conservatory of Music, Toronto ON

RESEARCH INTERESTS

- Quantum tomography
- Quantum circuit synthesis
- Combinatorial designs (incl. quantum combinatorial designs)
- Application of high-performance computing (incl. parallel programming and machine learning techniques) to physical problems

RESEARCH EXPERIENCE

Multi-scale discrete Wigner functions

Visiting student researcher
Max Planck Inst. for the Science of Light June - August 2017
October - November 2016
May - August 2015
Supervisors: Dr. L. L. Sánchez-Soto, Dr. M. Grassl

Parallelization of methods for quantum circuit synthesis

Masters/PhD thesis project
University of Waterloo January 2014 - Present
Supervisor: Dr. Michele Mosca

Relationships between mutually unbiased bases and mutually orthogonal Latin squares

Honours thesis, NSERC USRA summer student
Lakehead University Sept 2012 - August 2013
Supervisor: Dr. Hubert de Guise

Determining effective parameters for simulations of supernovae

NSERC USRA summer student
McMaster University April 2012 - August 2012
Supervisor: Dr. James Wadsley

Monte Carlo simulations of charge carriers on disordered surfaces

Research assistant, NSERC USRA summer student
Thunder Bay Regional Research Institute April 2011 - April 2012
Supervisor: Dr. Oleg Rubel

WORK EXPERIENCE

TA	PHYS 467 (office hours, marking, occasional lecture delivery) Department of Physics and Astronomy University of Waterloo	January - April 2016, 2017
PT Course Manager	Udacity	June 2014 - August 2015
TA	PHYS 111 (in-class tutorials, online course management, marking) Department of Physics University of Waterloo	January 2014 - April 2014
TA	PHYS 1113 (in-class tutorials) Department of Physics Lakehead University	September 2012 - December 2012
Marker	Department of Physics Department of Mathematical Sciences Lakehead University	Academic years 2011-2013 September 2011 - December 2011

COMPUTATIONAL SKILLS

- 8+ years C/C++
- 5+ years Python
- 3+ years parallel programming (OpenMP, MPI) on both desktop and large-scale cluster environments
- Regular user of Linux, fully proficient in command-line environment

ACADEMIC AWARDS

President's Graduate Scholarship, University of Waterloo, academic years 2015-2018
NSERC CGS D, University of Waterloo, academic years 2015-2018
President's Graduate Scholarship, University of Waterloo, academic year 2013-2014
Institute for Quantum Computing Entrance Award, University of Waterloo, 2013
NSERC CGS M, University of Waterloo, academic year 2013-2014
Dean's Scholar Award, Physics, Lakehead University, 2013
Ontario Graduate Scholarship, Lakehead University, academic year 2013-2014 (declined)
NSERC USRA, Lakehead University, summer 2013
NSERC USRA, McMaster University, summer 2012
NSERC USRA, Lakehead University (Thunder Bay Regional Research Institute), Summer 2011
President's List, Lakehead University (2009-2012)
Free Tuition Entrance Scholarship, Lakehead University (2009-2013)
Millennium Scholarship, 2009

PUBLICATIONS and PREPRINTS

H. de Guise, **ODM**, and L. L. Sánchez-Soto (2017) *Simple synthesis of unitary transformations*. <https://arxiv.org/abs/1708.00735>

ODM, L. L. Sánchez-Soto, G. Leuchs and M. Grassl (2017) *Coarse graining the phase space of N qubits*. Phys. Rev. A **95** 022340.

Amy M., **ODM**, Gheorghiu V., Mosca M., Parent A., Schanck J. (2017) *Estimating the Cost of Generic Quantum Pre-image Attacks on SHA-2 and SHA-3*. In: Avanzi R., Heys H. (eds) Selected Areas in Cryptography – SAC 2016. SAC 2016. Lecture Notes in Computer Science, vol 10532. Springer, Cham.

ODM, M. Mosca (2016) *Parallelizing quantum circuit synthesis*. Quantum Science and Technology **1** (1)

ODM (2015) *Parallelizing quantum circuit synthesis*. (MSc thesis, University of Waterloo).

ODM, D. Z. Djokovic, and I.S. Kotsireas (2015) *Symmetric Hadamard matrices of order 116 and 172 exist*. Special Matrices **3** (1), ISSN (Online) 2300-7451

M. Gaeta, **ODM**, A. B. Klimov, and H. de Guise (2014) *Discrete phase space approach to mutually orthogonal Latin squares*. J. Phys. A: Math. Theor. **47** 435303.

A. Darbandi, E. Devoie, **ODM**, and O. Rubel (2012) *Modeling the radiation ionization energy and energy resolution of trigonal and amorphous Selenium from first principles*. J. Phys.: Condens. Matter **24** 455502.

CONFERENCE PRESENTATIONS (INVITED)

ODM. *Parallelizing quantum circuit synthesis*. ICCAD'17 Workshop on Design Automation for Quantum Computers (16 November 2017, Irvine, California, USA). Oral presentation.

CONFERENCE PRESENTATIONS (CONTRIBUTED)

M. Amy, **ODM**, V. Gheorghiu, M. Mosca, A. Parent, J. Schanck (2016) *Estimating the cost of generic quantum pre-image attacks on SHA-2 and SHA-3*. TQC (27 September 2016, Berlin, Germany). Poster.

ODM, M. Mosca *Parallelizing quantum circuit synthesis*. TQC (27 September 2016, Berlin, Germany). Poster.

ODM, L. L. Sánchez-Soto, M. Grassl. *Multi-scale discrete Wigner functions*. 23rd Central European Workshop on Quantum Optics (30 June 2016, Kolymbari, Crete, Greece). Oral presentation.

ODM. *Parallelizing quantum circuit synthesis*. Quantum Computer Science (21 April 2016, Banff International Research Station, Banff, AB). Oral presentation.

ODM. *Dissociation of localized geminate excitations in amorphous selenium*. Lake Superior Medical Imaging Workshop (30 September 2011, Thunder Bay, ON). Oral presentation.

SEMINARS (INVITED)

ODM. *Introduction to quantum computing and parallel quantum circuit synthesis.* Bank of Canada (28 November 2017, Ottawa, ON). Oral presentation.

OTHER ACTIVITIES

Peer review: Journal of Physics A, Quantum Information Processing, New Journal of Physics

Scientific outreach: volunteering with *Let's Talk Science*, U. Waterloo, and IQC events

IQC Graduate Student Association: Member-at-large (2014-15), Vice president social (2015-16)