Paul T. Pham

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Education

University of Washington September 2005—December 2006
Candidate for Doctor of Philosophy in Computer Science March 2010—Present
Expected graduation date June 2013.
Quantum Computing Theory Group
Advisor: Aram Harrow

Massachusetts Institute of Technology
Master of Engineering in Electrical Engineering & Computer Science, February 2005.
Graduate GPA: 4.7/5.0
Thesis: A general-purpose pulse sequencer for quantum computing.
Advisor: Isaac Chuang

Bachelor of Science in Electrical Engineering and Computer Science, June 2004.
Undergraduate GPA: 4.2/5.0

Publications

"Quantum compiling single-qubit gates with the Kitaev-Shen-Vyalyi procedure"
P. Pham
In preparation.

"A 2D nearest-neighbor quantum architecture for factoring"
P. Pham, K.M. Svore. http://arxiv.org/abs/1207.6655
Reversible Computation Workshop, June 2012 Copenhagen, Denmark

"Component-based Invisible Computing"
A. Forin, J. Helander, **P. Pham**, J. Rajendiran.
IEEE Realtime Embedded Systems Workshop, December 2001

Posters

"A 2D Quantum Architecture for Factoring in Sub-Quadratic Depth"
P. Pham
Quantum Information Processing (QIP) Conference, December 2011.

"Quantum Compiling with Kitaev-Shen-Vyalyi"
P. Pham
Southwest Quantum Information and Technology (SQuInT), February 2011.

"Adiabatic Shelving to the $5D_{5/2}$ State in Trapped Barium Ions"
R. McClure, J. Booth, **P. Pham**, J. Wright, T. Noel, B. Blinov
Southwest Quantum Information and Technology (SQuInT), February 2011.

Patents

"Method and system for managing the execution of threads and data processing."
A. Forin, J. Helander, **P. Pham**.
U.S. Patent Application No. 20030233392.
Filed on June 12, 2002.

Invited Talks

University of British Columbia — Vancouver, Canada
Quantum architecture, compiling, and 2D factoring — September 2012
Hosted by Robert Raussendorf.

University of Innsbruck — Innsbruck, Austria
Quantum architecture, compiling, and 2D factoring — July 2012
Hosted by Rainer Blatt.

University of Freiburg — Freiburg, Germany
Quantum architecture, compiling, and 2D factoring — July 2012
Hosted by Tobias Schätz.

University of Aarhus — Aarhus, Denmark
Quantum architecture, compiling, and 2D factoring — July 2012
Hosted by Michael Drewsen.

Open Source Experience

Pulse Programmer — SourceForge
Project Admin, Lead Developer — January 2005—Present
`http://pulse-programmer.org`
Built an open source reconfigurable radio-frequency signal generator for quantum computing and quantum information processing experiments.

Quantum Compiler — SourceForge, Github
Project Admin, Lead Developer — January 2005—Present
`http://quantum-compiler.org`
Developed an open source code in Python and NumPy to implement the Solovay-Kitaev quantum compiling algorithm for generic, multi-qubit gates in SU(d). Simulated the Kitaev-Shen-Vyalyi quantum compiling algorithm in QCL and wrote code to measure its required resources. Accepted as qualifying examination project in the UW CSE Ph.D. program.

Students Supervised

University of Washington Computer Science & Engineering — Seattle, WA

Jeffrey Booth, Jr.	January 2010—Present
Noah Siegel	September 2012—Present
Andrea McCool	June 2010—Present
Harshad Petwe	June 2010—August 2011
Rob McClure	January 2010—March 2011
John Williams	January 2010—May 2010
David Nufer	January 2010—May 2010

Research Experience

Microsoft Research — Seattle, WA
Research Intern — June—August 2011
Quantum Architectures and Computation Group
Mentor: Krysta Svore
Designed a 2D nearest-neighbor quantum architecture for period-finding with depth $O(L \log L)$ for factoring an L-bit integer. Pending patent application.

University of Washington Dept. of Physics and Astronomy — Seattle, WA
Graduate Research Assistant — January—July 2007, May—June 2010
Trapped Ion Quantum Computing Group
Advisor: Prof. Boris Blinov
Built a programmable radio-frequency system for ion trap control including photo-multiplier tube input counting.

Max Planck Institute for Quantum Optics — Garching, Germany
Visiting Ph.D. Student — July 2005—August 2005
Quantum Analog Simulation Group

Advisor: Dr. Tobias Schätz
Built a programmable radio-frequency system for ion trap control with phase-coherent frequency-switching.

University of Innsbruck Innsbruck, Austria
Visiting Ph.D. Student February 2005—June 2005
Quantum Optics and Spectroscopy Group
Advisor: Univ. Prof. Rainer Blatt
Built a programmable radio-frequency system for ion trap control with shaped amplitudes.

MIT Center for Bits and Atoms Cambridge, Massachusetts
Graduate Research Assistant September 2003—January 2005
quanta Research Group
Advisor: Prof. Isaac Chuang
Designed and built instrumentation for quantum computing experiments.

Microsoft Research Redmond, WA
Research Intern June 2001—September 2001
Invisible Computing Group June 2003—August 2003
Mentors: Alessandro Forin, Johannes Helander
Added work items to the scheduler of an embedded real-time kernel. Designed and assembled the electronics for a wireless sensor demo.

Activities

MIT ACM/IEEE Programming Competition Cambridge, Massachusetts
Contest Chair, Lead Developer, Organizer 2001-2003

`http://web.mit.edu/ieee/6.370/2003/web/`

Teaching Experience

University of Washington Seattle, Washington
Teaching Assistant, Computer Science & Engineering Department

Advanced Internet Services (CSE 454) January 2012—Present
Professor Oren Etzioni

The Hardware/Software Interface (CSE 351) April—June 2010
Professor Gaetano Borriello

Data Structures (CSE 326) September—December 2006
Professor Larry Snyder

Software Development Tools (CSE 303) April—June 2006
Professor Magda Balazinska

Algorithms (CSE 417) January—March 2006
Professor Larry Ruzzo

Discrete Structures Class (CSE 321) September—December 2005
Professors Dieter Fox & Anna Karlin

MIT Elec. Eng. & Computer Science Dept. Cambridge, Massachusetts

Teaching Assistant
Software Engineering Laboratory Class (6.170) January 2004—May 2004
Professor Rob Miller

Lab Assistant
Software Engineering Laboratory Class (6.170) September 2002—May 2003
Professors Michael Ernst & Daniel Jackson

References

Krysta Svore
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E-mail: ksvore@microsoft.com

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Max Planck Institute for Quantum Optics
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