Curriculum Vitae

Christine A. Muschik

Personal data

Place and date of birth	Munich (Germany), June 4, 1980
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Education and professional experience

Since Jun 2019	Associate faculty member at the Perimeter Institute for Theoretical Physics in Waterloo, Canada
Since Nov 2017	Assistant professor at the Institute for Quantum Computing and the University of Waterloo, Canada
2014-2017	Postdoctoral fellow and university assistant at IQOQI – Institute for Quantum Optics and Quantum Information in Innsbruck, Austria
2011-2014	Postdoctoral fellow at ICFO – The Institute of Photonic Sciences in Castelldefels, Spain
2006-2011	Dissertation at Max Planck Institute of Quantum Optics, Munich, Germany (Result 1.0, summa cum laude - highest grade)
2005-2006	Physics diploma (masters) at Max Planck Institute of Quantum Optics (Result 1.0, with honors - highest grade)

Scholarships, awards, and honors

2021	President's Research Excellence Award of the University of Waterloo
2020	President's Research Excellence Award of the University of Waterloo
2020	CIFAR Global Scholar Fellowship "Research Leaders of Tomorrow"
2019	Sloan Fellowship for Outstanding Early Career Researchers
2018	Emmy Noether Fellowship for Faculty-level Scientists by Perimeter Institute
2017	Elise Richter Fellowship for Senior Postdoctoral Researchers by the Austrian Science fund (declined due to relocation to Canada)
2016	Award of the City of Innsbruck for Scientific Research
2016	First-author paper [Nature 534, 516-519 (2016)] selected as one of the "Top 10 Breakthroughs in Physics 2016" by Physics World

2011-2013	Feodor Lynen Research Fellowship for Postdoctoral Researchers by the Alexander von Humboldt Foundation
2006-2010	Scholarship by the International PhD Program of Excellence for Highly Gifted Students: Quantum Computing, Control and Communication supported by the Elite Network of Bavaria
1999-2005	Bavarian Scholarship for highly gifted students ("Bayerische Hochbegabtenförderung")
2003	Finalist, German Study Award ("Deutscher Studienpreis") with a study on noncommutative geometry
1998 - 2005	Scholarship by the German Academic Scholarship Foundation ("Studienstiftung des Deutschen Volkes"), awarded to the top 0.5% of students at German universities.
1999	Student contest "SUCCESS" initiated by ESA with a project on supraconductivity (Finalist, 4th prize in Europe)
1999	Citizen Prize for Commitment, Achievement and Innovation ("Bürgerpreis Fürstenfeldbruck für Engagement, Leistung und Innovation")

Invited talks at conferences, workshops, and meetings

1. Annual meeting of the program "Matter and Technologies" of the Helmholtz Association, online due to Covid 19, June 2021
2. CIFAR QIS program meeting, online due to Covid 19, September 2020
3. ARL CDQI meeting 2020, online due to Covid 19, September 2020
4. DAMOP Conference 2020, online due to Covid 19, June 202
5. Simons Collaboration on "It from Qubit" - Annual meeting in New York, US, December 2019
6. Conference on "Exploring Open Quantum Systems in Quantum Simulators" at Kavli Institute for Theoretical Physics in Santa Barbara, US, May 2019
7. Colloquium at Perimeter Institute in Waterloo, Canada, April 2019
8. APS March Meeting 2019 in Boston, US, March 2019
9. Workshop on "Quantum Simulation" at Solvay Institute, Brussels, Belgium, February 2019
10. PQE-Conference 2019 - Physics of Quantum Electronics in Snowbird, US, January 2019
11. Conference on "Entanglement at collider energies" in Stony Brook, US, September 2018
12. Conference on "Current trends in open and nonequilibrium quantum optical systems" in Erlangen, Germany, July 2018
13. Workshop on "Data Science and Quantum Computing" at TRIUMF in Vancouver, Canada, June 2018

14. 2018 CAP congress in Halifax, Canada, June 201
15. Workshop on "Entanglement in Quantum Systems" in Florence, Italy, June 2018
16. CIFAR Workshop on "Quantum Information Science" in Québec, Canada, April 2018
17. ARL CDQI meeting in Boston, US, April 2018
18. Conference on "Intersections between Nuclear Physics and Quantum Information (NPQI 2018)" in Argonne, US, March 2018
19. Conference "Beyond Conventional Computing: The Power of Quantum and Neural Networks" in Heidelberg, Germany, March 2018
20. Workshop on "Quantum Simulation and Computation" in Bilbao, Spain, February 2018
21. 2nd Workshop for Quantum Repeaters and Networks in Seefeld, Austria September 2017
22. Conference of the European Group on Atomic Systems (EGAS) in Durham, UK, July 2017
23. Conference on "Quantum Networks" (IEEE Photonics Society Summer Topicals Meeting Series) in San Juan, Puerto Rico, July 2017
24. International Conference "Quantum science approaches to strongly correlated systems: from ultracold atoms to high-energy and condensed matter physics" in Florence, Italy, May 2017
25. ARL CDQI meeting in Madison, US, March 2017
26. Workshop: Quantum methods for lattice gauge theories calculations in Mainz, Germany, February 2017
27. XXII IFT Christmas Workshop (Instituto de Fisica Teorica UAM/CSIC) in Madrid, Spain, December 2016
28. AFTQ16 Workshop16: "Cold atoms and quantum technologies" in Paris, France, December 2016
29. Quantum Innovators Workshop 2016 at the Institute for Quantum Computing in Waterloo, Canada, October 2016
30. Meeting on quantum communication and quantum imaging in Berlin, Germany, August 2016
31. SIQS workshop in Venice, Italy, March 2016
32. International Conference on Quantum Optics 2016 in Obergurgl, Austria, February 2016
33. ARL CDQI meeting in Washington, US, December 2015
34. ARL CDQI kick-off meeting in Washington, US, July 2015
35. SIQS workshop in Barcelona, Spain, March 2015
36. Quantum Technologies Conference V in Krakow, Poland, September 2014
37. QCCC workshop in Prien, Germany, October 2013
38. Workshop "Quantum Physics – from fundamental questions to applications" in

Barcelona, Spain, May 2013

39. Workshop “Theory of Quantum Gases and Quantum Coherence” in Lyon, France, June 2012
40. COQUIT workshop in Munich, Germany, February 2012
41. QCCC workshop in Bernried, Germany, October 2011
42. QUEVADIS meeting in Brussels, Belgium, August 2011
43. Workshop “Hamiltonians and Gaps” in Cambridge, UK, September 2010
44. QUEVADIS meeting in Brussels, Belgium, August 2010
45. CV-QIP workshop in Herrsching, Germany, June 2010
46. COMPAS meeting in Brussels, Belgium, November 2009
47. QCCC workshop in Bad Tölz, Germany, October 2009

Invited seminar talks and colloquia

1. EPFL Lausanne, Switzerland, June 2021, online due to Covid 19
2. QuantHEP, Quantum Computation and High Energy Physics online seminar series, June 2021
3. CERN “Theory Colloquium”, Switzerland, May 2021, online due to Covid 19
4. University of Aachen, Germany, February 2021, online due to Covid 19
5. University of Heidelberg, Germany, January 2021, online due to Covid 19
6. INMA, Instituto de Nanociencia y Materiales de Aragón, Spain, December 2020, online due to Covid 19.
7. University of Toronto, Canada, December 2020, online due to Covid 19
8. Perimeter Institute, Waterloo, Canada, April 2019
9. Rigetti Quantum Computing, Berkeley, US, April 2018
10. Collége de France, Paris, France, December 2017
11. IQC (Institute for Quantum Computing), Waterloo, Canada, January 2017
12. University of Colone, Germany, January 2017
13. University of Bonn, Germany, November 2016
14. University of Siegen, Germany, July 2016
15. QuICS (Joined Center for Quantum Information and Computer Science), Maryland, US, March 2016
16. Harvard University, Cambridge, US, March 2016
17. JQI (Joint Quantum Institute), Maryland, US, December 2015
18. ETH Zürich, Switzerland, December 2015

19. University of Oxford, UK, November 2015
20. University of Basel, Switzerland, September 2015
21. Niels Bohr Institute, Copenhagen, Denmark, May 2015
22. Abbe Center of Photonics - Friedrich Schiller-Universität, Jena, Germany, November 2014
23. Max Planck Institute for the Science of Light, Erlangen, Germany, October 2014
24. Ludwig-Maximilians-Universität, Munich, Germany, May 2014
25. University of Ulm, Germany, May 2014
26. University of Innsbruck, Austria, May 2014
27. University of Vienna, Austria, April 2014
28. Leibniz University, Hannover, Germany, September 2012
29. RWTH Aachen, Germany, March 2012
30. University of Innsbruck, Austria, December 2010
31. Chalmers University of Technology, Gothenburg, Sweden, September 2010
32. University of Aarhus, Denmark, April 2010
33. University of Vienna, Austria, February 2010
34. University of Aarhus, Denmark, December 2008
35. Niels Bohr Institute, Copenhagen, Denmark, November 2008

Research funding history

2020-2022	Joint Perimeter-IQC Initiative: QFun - Quantum Simulations of Fundamental Interactions
2020-2022	CIFAR Azrieli Global Scholars Fellowship
2019-2021	Alfred P. Sloan Research Fellowship
2019-2021	NFRF Exploration grant, principal investigator
2018-2021	CFREF, Transformative Quantum Technologies grant
2018-2021	ERA-Net funding by the European Commission, Project QTFLAG: Quantum Technologies For Lattice Gauge theories, principal investigator
2018-2019	Emmy Noether fellowship by Perimeter Institute for faculty-level scientists
2018-2023	NSERC Discovery Grant, principal investigator
2018	Shortlisted CIFAR research program, co-director (see https:// www.cifar.ca/cifarnews/2018/04/19/cifar-short-lists-12-proposals-in-global-call-for-ideas)
2017	Elise Richter Fellowship by the Austrian Science Funds, declined due to relocation to Canada

2015-2019 U.S. Army Research Lab (ARL), Project SciNet: Scalable Memory-Enhanced Ion-Trap Quantum Network, team leader

Teaching

2021	"PHYS 434: Quantum Physics 3", lecture course (3h/week) at the University of Waterloo
2021	"PHYS 334: Quantum physics 2", lecture course (3h/week) at the University of Waterloo
2020	"PHYS 434: Quantum physics 3", lecture course (3h/week) at the University of Waterloo
2019	Undergraduate School on Experimental Quantum Information Processing (USEQIP), at the Institute of Quantum Computing in Waterloo
2019	"PHYS 434: Quantum physics 3", lecture course (3h/week) at the University of Waterloo
2018	Undergraduate School on Experimental Quantum Information Processing (USEQIP), at the Institute of Quantum Computing in Waterloo
2016 – 2017	"Quantum optical implementations of quantum networks", lecture course (2h/week) at the University of Innsbruck
2016 - 2017	"Mathematical methods", proseminar (1h/week) at the University of Innsbruck
July 2016	Quantum information summer school 2016, University of Innsbruck
2006 - 2007	"Quantum information theory I" and "Quantum information theory II", Tutorial and exercise classes at the Technical University Munich

Selected publications

1. SU(2) hadrons on a quantum computer,
   Y. Atas, J. Zhang, R. Lewis, A. Jahanpour, J. Haase, and C. Muschik
   Nature Commun. 12, 6499 (2021).
   3 min summary here, Physics World article here

2. A measurement-based variational quantum eigensolver,
   R. Ferguson, L. Dellantonio, K. Jansen, A. Balushi, W. Dür, and C. Muschik
   Phys. Rev. Lett. 126, 220501 (2021).
   MSc thesis received the Dean of Science award "for innovative research"
   3 min summary here, APS news article here

3. Autonomous quantum error correction and application to quantum sensing with trapped ions,
   F. Reiter, A. Sørensen, P. Zoller, and C. Muschik,
   Nature Commun. 8, 1822 (2017).

4. Real-time dynamics of lattice gauge theories with a few-qubit quantum computer,
E. Martinez*, C. Muschik*, P. Schindler, D. Nigg, A. Erhard, M. Heyl, P. Hauke, M. Dalmonte, T. Monz, P. Zoller, R. Blatt,
Nature 534, 516 (2016).
*Both authors contributed equally to this work
Selected by Physics World as one of the top ten breakthroughs in physics 2016.

5. Deterministic quantum teleportation between distant atomic objects,
H. Krauter, D. Salart, C. Muschik, J. Petersen, H. Shen, T. Fernholz, and E. Polzik,
Nature Phys. 9, 400 (2013).

6. Entanglement generated by dissipation and stead state entanglement of two macroscopic objects,
H. Krauter*, C. Muschik*, K. Jensen, W. Wasilewski, J. Petersen, I. Cirac, E. Polzik,
Rev. Lett. 107, 080503 (2011).
*Both authors contributed equally to this work.

Selected press coverage

1. Scientific American: In a First, Quantum Computer Simulates High-Energy Physics
2. Nature News and Views: Quantum simulation of fundamental physics
3. Nature News: Quantum computer makes first high-energy physics simulation
4. Physics World: Quantum computer simulates fundamental particle interactions for the first time
5. Nature News and Views: Quantum teleportation: Getting complicated
6. Physics World: Quantum teleportation done between distant large objects
7. Forbes: New Technique Could Pave the Way for Quantum Information Networks
8. Phys.org: Quantum optical link sets new time records
9. New Scientist: How to make a quantum entanglement last
10. Science News: Making lemonade with quantum lemons