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## Curriculum Vitae

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Clemens Dlaska

(June 2024)

### Personal Details

Titles: Univ.-Prof., Dr. med. univ., BSc, MSc, PhD  
Date of birth: 13. 10. 1988  
Place of birth: Innsbruck  
Nationalities: Austrian/Italian  
Address: Andreas-Hofer-Straße 4, 6020 Innsbruck  
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### Professional Experience

- 02/2024 – present     **Professor of Digital Medicine in Cardiology**
- Head of Digital Cardiology Group, Medical University of Innsbruck, University Clinic of Internal Medicine III - Cardiology and Angiology
- 10/2021 – 01/2024     **Universitätsassistent**
- University of Innsbruck, Institute for Theoretical Physics
  - Quantum Optimization group led by Prof. Wolfgang Lechner
- 09/2017 – 09/2021     **Research associate**
- University of Innsbruck, Institute for Theoretical Physics, and Austrian Academy of Sciences, Institute for Quantum Optics and Quantum Information (IQOQI) Innsbruck
  - Quantum Optimization group led by Prof. Wolfgang Lechner
- 07/2016 – 07/2017     **Scientific assistant**
- ETH Zürich, Institute for Neuroinformatics and Institute for Biomedical Engineering
  - Neurotechnology group led by Prof. Mehmet Fatih Yanik
- 08/2015 – 06/2016     **Research associate**
- University of Innsbruck, Institute for Theoretical Physics and Austrian Academy of Sciences, IQOQI Innsbruck

- Quantum Optics and Quantum Information group led by Prof. Peter Zoller

## Higher Education

- 09/2017 – 04/2023 **Doctor of Philosophy (PhD) in Physics**, University of Innsbruck  
 Thesis: *Algorithm and Hardware co-design for parity quantum computing – State preparation, quantum optimization and Rydberg implementation*  
 Advisor: Prof. Wolfgang Lechner, Institute for Theoretical Physics
- 10/2012 – 06/2015 **Master of Science (MSc) in Physics**, University of Innsbruck  
 Thesis: *Superradiance with Rubidium atoms in Rydberg P-states*  
 Advisor: Prof. Peter Zoller, Institute for Theoretical Physics and IQOQI
- 10/2008 – 08/2012 **Bachelor of Science (BSc) in Physics**, University of Innsbruck  
 Thesis: *Photodetektion und Quantenrauschen*  
 Advisor: Prof. Helmut Ritsch, Institute for Theoretical Physics
- 10/2006 – 01/2013 **Medical doctor (Dr. med. univ.)**, Medical University of Innsbruck  
 Thesis: *Dihydropyridine sensitivity of an embryonic  $Ca_v1.1$   $Ca^{2+}$  channel splice variant*  
 Advisor: Prof. Bernhard Flucher, Institute of Physiology

## Publications

1. D. Basilewitsch, C. Dlaska, W. Lechner, *Comparing planar quantum computing platforms at the quantum speed limit*, Phys. Rev. Research 6, 023026 (2024), DOI: 10.1103/PhysRevResearch.6.023026
2. M. Lanthaler\*, C. Dlaska\*, K. Ender, W. Lechner, *Rydberg-blockade-based parity quantum optimization*, Phys. Rev. Lett. 130, 220601 (2023), DOI: 10.1103/PhysRevLett.130.220601, \* These authors contributed equally
3. K. Ender, A. Messinger, M. Fellner, C. Dlaska, W. Lechner, *Modular parity quantum approximate optimization*, PRX Quantum 3, 030304 (2022), DOI: 10.1103/PRXQuantum.3.030304
4. S. J. Reinstadler, C. Dlaska, M. Reindl, M. Marks, *Predicting cardiac remodeling after myocardial infarction with machine learning: are we there yet?*, Int. J. Cardiol. 355:6-7 (2022), DOI: 10.1016/j.ijcard.2022.03.016
5. C. Dlaska, K. Ender, G. B. Mbeng, A. Kruckenhauser, W. Lechner, R. van Bijnen, *Quantum optimization via four-body Rydberg gates*, Phys. Rev. Lett. 128, 120503 (2022), DOI: 10.1103/PhysRevLett.128.120503

6. C. Dlaska, L. M. Sieberer, W. Lechner, *Designing ground states of Hopfield networks for quantum state preparation*, Phys. Rev. A 99, 032342 (2019), DOI: 10.1103/PhysRevA.99.032342
7. C. Dlaska<sup>\*</sup>, B. Vermersch<sup>\*</sup>, P. Zoller, *Robust quantum state transfer via topologically protected edge channels in dipolar arrays*, Quantum Sci. Technol. 2, 015001 (2017), DOI: 10.1088/2058-9565/2/1/015001, <sup>\*</sup> These authors contributed equally
8. B. Benedetti, P. Tuluc, V. Bastrolia, C. Dlaska, B. E. Flucher, *Physiological and pharmacological modulation of the embryonic skeletal muscle calcium channel splice Variant  $Ca_v1.1e$* , Biophys. J. 108:1072-1080 (2015), DOI: 10.1016/j.bpj.2015.01.026

## Patent application

*Quantum optimization of general combinatorial optimization problems using programmable atom arrays*, M. Lanthaler, C. Dlaska, K. Ender, W. Lechner, PCT Patent App. PCT/EP2023/059353

## Talks

1. *Künstliche Intelligenz in der Echokardiographie – ein Blick in die Zukunft*, Update Echokardiographie 2024, Innsbruck, Österreich, 05.06.2024
2. *Künstliche Intelligenz – einfach erklärt*, Kardiologiekongress Innsbruck 2024, Innsbruck, Österreich, 07.03.2024
3. *Rydberg-blockade-based parity quantum optimization*, APS March Meeting 2023, Las Vegas, USA, 09.03.2023
4. *Quantum optimization via four-body Rydberg gates*, Center for Quantum Science Seminar (online), Eberhard-Karls Universität Tübingen, Germany, 09.07.2022
5. *Digital parity quantum optimization with Rydberg atoms*, Parity QC retreat, Matrie am Brenner, Austria, 03.03.2022
6. *A novel Rydberg many-body gate applied to quantum optimization*, DARPA-ONISQ-collaboration meeting (online), 24.06.2021
7. *Quantum convolutional neural networks*, Quantum Optics Seminar (online) (group seminar of Prof. Hannes Pichler/Prof. Peter Zoller), University of Innsbruck, Austria, 19.01.2021
8. *Designing ground states of Hopfield networks for quantum state preparation*, ESI Conference: Quantum Computing in Near Term, Vienna, Austria, 22.10.2019
9. *Designing ground states of Hopfield networks for quantum state preparation*, AQC 2019 – Adiabatic Quantum Computing Conference, Innsbruck, Austria, 24.06.2019

10. *Solving the quantum many-body problem with artificial neural networks*, Lechner Group retreat, Maria Waldrast, Austria, 01.03.2018
11. *Electromagnetically induced transparency and dark-state polaritons*, Quantum Optics group seminar of Prof. Peter Zoller, University of Innsbruck, 03.03.2014

## Posters

1. *Modular parity quantum approximate optimization*, 26<sup>th</sup> Conference on Quantum Information Processing, Ghent University, Brussels, 06.02.2023
2. *Stroboscopic Rydberg dressing for near term quantum optimization*, Austrian Quantum Information Conference 2019, Vienna, Austria, 31.10.2019
3. *Stroboscopic Rydberg dressing for near term quantum optimization*, Theo Murphy International Scientific Meeting of the Royal Society, Continuous-time quantum computing and simulation: perspectives and challenges, Chicheley Hall, Buckinghamshire, UK, 02.10.2019
4. *Designing ground states of Hopfield networks for quantum state preparation*, Quantum Computing – From Algorithms to Applications (QIP2019), Obergurgl, Austria, 16.4.2019
5. *Designing ground state of Hopfield networks for quantum state preparation*, Conference on Quantum Machine Learning Plus, Innsbruck, 17.09.2018
6. *Superradiance with Rubidium atoms in Rydberg P-states*, Cold-atoms PreDoc School on Exploring new Quantum Gases, Les Houches, France, 21.09.2015

## Awards

**Forschungspreis der Wirtschaftskammer Tirol 2023 (Kategorie Naturwissenschaften)**

**Invited interview for Physics World Magazine** covering our paper on “Quantum optimization via four-body Rydberg gates” (2022)

**Highlights of 2017** in Quantum Science and Technology Journal (IOP), our paper on “Robust quantum state transfer via topologically protected edge channels in dipolar arrays” was selected as one of six papers identified as best papers within the period 2016-2017

## Organization of International Conference

Local organizing team, AQC 2019 – Adiabatic quantum computing conference, Innsbruck, Austria, 24.-28. June 2019

## Teaching experience

SS 2024	<b>Digital Cardiology</b> , Part of Digital Medicine Lecture Series, Medical University of Innsbruck
SS 2023	<b>Proseminar Mathematical Methods in Physics I</b> (Ordinary Differential Equations, Vector Analysis, Fourier Analysis, Probability Theory), University of Innsbruck
WS 2022	<b>Proseminar Mathematical Methods in Physics II</b> (Complex Variable Theory and Partial Differential Equations), University of Innsbruck
WS 2021	<b>Proseminar Mathematical Methods in Physics II</b> (Complex Calculus and Partial Differential Equations), University of Innsbruck
SS 2018	<b>Proseminar Theoretical Physics 4 (Statistical Physics)</b> , University of Innsbruck
WS 2017	<b>Physics 1: Mechanics and Thermodynamics for Atmospheric Sciences</b> , Exercises, University of Innsbruck

## Languages

**German:** native language

**English:** very good knowledge (IELTS January 2015: overall: 8.0, listening: 9.0, reading: 8.5, writing: 7.5, speaking: 7.0)

**Italian:** basic knowledge