Capturing dynamics with noisy quantum computers

Dechant, D.S.

Curriculum Vitæ

I was born on 28 December 1995 in Fulda, Germany, where I grew up on a farm in a nearby village. In Fulda, I attended the Rabanus-Maurus-Schule (Domgymnasium Fulda), from which I graduated in 2014.

In the same year, I began my studies in mathematics with a minor in theoretical physics at Georg-August-Universität Göttingen. Fascinated by the theoretical foundations of physics, I also enrolled in the bachelor's program in physics and completed both degrees in 2018. During an exchange semester at the National University of Singapore in fall 2017, I took a course on quantum information and computation, which sparked my lasting interest in this field. As there was no research group in quantum information in Göttingen at that time, I conducted my bachelor's thesis in condensed matter theory under the supervision of Fabian Heidrich-Meisner and Thomas Schick.

To deepen my understanding of quantum physics and quantum information, I continued with a master's degree in physics at the University of Copenhagen from 2018 to 2020, specializing in quantum physics. I wrote my master's thesis in the QMath group under the supervision of Matthias Christandl.

For my PhD studies, I joined the Applied Quantum Algorithms (aQa) group and the Lorentz Institute at Leiden University, where I was supervised by Jordi Tura and Vedran Dunjko. My research focused on variational quantum algorithms and their applications. I collaborated with various researchers on all of my projects and had the opportunity to co-supervise several bachelor's and master's students. During my PhD, I participated in several international schools and conferences, presenting my work and broadening my knowledge and network in the Netherlands, Germany, France, Spain, the United Kingdom, and Belgium.

Following the completion of my PhD, I will continue my research as a post-

doctoral researcher at the Technical University of Hamburg in the group of Martin Kliesch, working on fault-tolerant quantum algorithms.

List of publications

[88] A. Manzano, **D. Dechant**, J. Tura & V. Dunjko. Approximation and generalization capacities of parametrized quantum circuits for functions in Sobolev spaces. *Quantum*, **9**, 1658 (2025).
[Chapter 2 is based on this publication.]

[46] **D. Dechant**, L. Markovich, V. Dunjko & J. Tura. Error and resource estimates of variational quantum algorithms for solving differential equations based on Runge-Kutta methods. *Journal of Mathematical Physics* **67**, 012205 (2026).
[Chapter 3 is based on this publication.]

[90] Z. J. Wang, **D. Dechant**, Y. J. Patel & J. Tura. Mitigating shot noise in local overlapping quantum tomography with semidefinite programming. *Physical Review A*, **111**, 052444 (2025).
[Chapter 4 is based on this publication.]

[91] **D. Dechant**, E. Schwander, L. van Drooge, C. Moussa, D. Garlaschelli, V. Dunjko & J. Tura. Quantum generative modeling for financial time series with temporal correlations. *Machine Learning: Science and Technology* (2026).
[Chapter 5 is based on this publication.]