

EDUCATION

University of British Columbia

Ph.D. in Computer Science and Applied Mathematics

- **Honors:** LANL Quantum Computing 2024 Fellow | NSERC CREATE Quantum Computing Scholar

Sep/2022 – Present

Vancouver, Canada

Technical University of Darmstadt

M.Sc. in Autonomous Systems | GPA: 1.06 (German scale, 1.0 is top)

M.Sc. in Computer Science (Minor: Optimization) | GPA: 1.10 (German scale, 1.0 is top)

- **Honors:** Graduated with Honors | German Federal Merit Scholarship (2019–2022) | DAAD Exchange Scholarship (2021)
- **Exchange:** University of British Columbia (Sep–Dec/2021) | Sessional Avg: 96.3%

Oct/2019 – Aug/2022

Darmstadt, Germany

Technical University of Darmstadt

B.Sc. in Computer Science | GPA: 1.33 (German scale, 1.0 is top)

- **Honors:** German Federal Merit Scholarship (Deutschlandstipendium, 2017–2018)

Oct/2015 – Jun/2019

Darmstadt, Germany

RESEARCH & INDUSTRY EXPERIENCE

Ph.D. Researcher

University of British Columbia

- Driving dissertation research on the role of inductive bias in scaling quantum machine learning and variational algorithms
- Targeting practical advantage by developing frameworks for quantum chemistry and physics applications
- Advancing core dissertation research objectives via concurrent, competitive research fellowships at LANL, DLR, and BMW Group
- Ph.D. Research Proficiency Eval.: Proved efficient classical tensor network simulation of shallow local barren plateau-free VQAs

Sep/2022 – Present

Vancouver, Canada

Research Intern

BMW Group: Emerging Technologies and Innovations

- Evaluated state-of-the-art quantum generative models to identify core limitations in real-world image quality and diversity
- Designed an end-to-end quantum generator via an image-specific ansatz and multimodal noise for advanced image generation
- Developed and deployed a high-performance quantum simulation suite in JAX for execution on GPU workstations

Jan/2025 – April/2025

München, Germany

Research Fellow

Los Alamos National Lab (LANL): Quantum Computing Summer School 2024

- Formulated a provable and scalable quantum Gaussian processes theory, applied to regression, classification and optimization
- Analyzed the barren plateau phenomenon in quantum cost landscapes with correlated parameters via Floquet theory
- Collaborated with LANL scientists to drive theoretical quantum research, integrating insights from global invited experts

Jun/2024 – Aug/2024

Los Alamos, USA

Visiting Researcher

German Aerospace Center (DLR): Quantum Computing for Materials (QuantiCoM) Project

- Investigated quantum computing for materials science, specializing in quantum machine learning and fermionic optimization
- Identified limitations of quantum data arguments, and improved scalability and efficacy via quantum-aware algorithms
- Partnered with over 20 researchers across three DLR institutes and industry partners to drive QuantiCoM project deliverables

Oct/2023 – May/2024

Köln, Germany

Teaching Assistant

University of British Columbia

Technical University of Darmstadt

- Instructed and evaluated upper-year and graduate-level courses in Quantum Computing (UBC, TU), Computational Optimization (UBC), and Machine Learning & Data Mining (TU)

Oct/2018 – Dec/2025

Vancouver, Canada

Darmstadt, Germany

Master's Thesis Researcher

Technical University of Darmstadt: Gachechiladze's Quantum Computing group

- Benchmarked neural network quantum tomography methods (from Boltzmann to state-of-the-art Transformer models)
- Devised an advanced evaluation scheme from entanglement theory

Feb/2022 – Aug/2022

Darmstadt, Germany

Graduate Researcher

University of British Columbia: Krems' Group

- Devised complexity-theoretic (BQP) benchmark dataset and proved universal expressivity of quantum machine learning models
- Co-supervised follow-up research studying the generation and properties of the data set for practical application

Sep/2021 – Apr/2022

Vancouver, Canada

Research Assistant

Jul/2019 – Jun/2020

Technical University of Darmstadt: Peters' Intelligent Autonomous Systems group

Darmstadt, Germany

- Implemented industrial reinforcement learning with ABB, and optimized HPC simulation performance via MPI multi-processing

Bachelor's Thesis Researcher

Dec/2018 – Jun/2019

Technical University of Darmstadt: Fürnkranz's Knowledge Engineering group

Darmstadt, Germany

- Designed and evaluated a novel method for regularizing neural networks to mitigate over-fitting via knowledge distillation

Co-Founder & Lead Developer

Jul/2012 – Apr/2016

PixoSoft App Development – Jonas Jäger, Sebastian Nikles GbR

Dreieich, Germany

- Engineered full-stack iOS applications for iPhone and iPad, ranging from arcade games to an aviation social network

TECHNICAL SKILLS

Languages: Python, Julia, C/C++, Mathematica, Matlab, LaTeX, SQL, Java, Swift, Objective C, Prolog, Racket, Verilog, Bluespec

Frameworks & Tools: Qiskit, PennyLane, Cirq, Tangelo, iTensor.jl, JAX, PyTorch, TensorFlow, Scikit-learn, SciPy, Git

PUBLICATIONS

- J. Jäger**, Y. Khmel'nitskiy, P. Braccia, A. Miroszewski, D. García-Martín, M. Cerezo, and P. Czarnik, “[Quantum gaussian processes for prediction of channel observations](#),” *arXiv preprint*, 2026.
- J. Jäger**, P. Braccia, P. Bermejo, M. G. Algaba, D. García-Martín, and M. Cerezo, “[Provable and scalable quantum gaussian processes for quantum learning](#),” *arXiv preprint*, 2026.
- P. Kairon, **J. Jäger**, and R. V. Krems, “[Equivalence between exponential concentration in quantum machine learning kernels and barren plateaus in variational algorithms](#),” *Phys. Rev. A*, vol. 114, no. 2, Aug. 2026.
- J. Jäger**, F. J. Kiwit, and C. A. Riofrío, “[Scaling quantum machine learning without tricks: Full-resolution and diverse image generation](#),” *Quantum Science and Technology*, vol. 11, no. 3, Jul. 2026.
- J. Jäger**, P. Elsässer, and E. Torabian, “[Quantum feature-map learning with reduced resource overhead](#),” *Physical Review Research*, May 2026.
- J. Jäger**, T. N. Kaldenbach, M. Haas, and E. Schultheis, “[Fast gradient-free optimization of excitations in variational quantum eigensolvers](#),” *Communications Physics*, vol. 8, no. 1, 2025.
- J. Jäger** and R. V. Krems, “[Universal expressiveness of variational quantum classifiers and quantum kernels for support vector machines](#),” *Nature Communications*, vol. 14, no. 1, Feb. 2023.
- J. Jäger**, F. Helfenstein, and F. Scharf, “[Bring Color to Deep Q-Networks: Limitations and Improvements of DQN Leading to Rainbow DQN](#),” in *Reinforcement Learning Algorithms: Analysis and Applications*, Springer, 2021.
- F. Scharf, F. Helfenstein, and **J. Jäger**, “[Actor vs Critic: Learning the Policy or Learning the Value](#),” in *Reinforcement Learning Algorithms: Analysis and Applications*, Springer, 2021.

PATENTS

- J. Jäger**, T. N. Kaldenbach, M. Haas, and E. Schultheis, “Methods for determining energies and energy states (*unofficial title translation*),” German patent DE102024115387.3 *Submitted*, 2024.

PRESENTATIONS AND TALKS

- Invited Talk, *Provable and scalable quantum Gaussian processes for quantum learning*, IQM Quantum Computers, Munich, Germany, 2026.
- Quantum UniPa Group Seminar, *Provable and scalable quantum Gaussian processes for quantum learning*, University of Palermo, 2026.
- Quantum Information Seminar Series, *Quantum & Machine Learning: A Powerful Combination? Possibilities, Methods, and Limitations*, University of British Columbia Quantum Club & Physics and Astronomy, 2026.
- Quantum BC Seminar Series, *Analytic reconstructions to power gradient-free optimization applied to quantum chemistry and quantum machine learning* (co-presenter: E. Torabian), Quantum BC, Vancouver, Canada, 2025.
- Yearly 3-Minute-Thesis (3MT) presentation, CREATE Quantum Computing program, Vancouver, Canada, 2023 – 2025.
- Invited Talk, *ExcitationSolve*, IQM Quantum Computers, Munich, Germany, 2025.
- Quantum Machine Learning Workshop, *Introduction to Quantum Machine Learning Methods*, University of British Columbia Quantum Club, 2023.
- Quantum Computing Grand Challenge Workshop, *On the Quantum Advantage of Quantum Machine Learning*, Stewart Blusson Quantum Matter Institute, Vancouver BC, 2023.
- Workshop on Quantum Computing and Operations Research, *Universal Expressiveness of Quantum Machine Learning Classifiers* (Poster), Fields Institute, Toronto ON, Canada, 2022.