Dr Asel Sagingalieva — CV

@Asel Sagingalieva

Founder & CEO, EigenOrbit · Quantum Machine Learning · Applied Quantum Computing

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Profile

Quantum computing scientist and founder who turns quantum machine learning research into products enterprises pay for. Founder and CEO of **EigenOrbit** (since October 2026), the independent decision and orchestration layer for quantum and hybrid computing.

Before that, 6 years 9 months at **Terra Quantum**, one of Europe's leading quantum technology companies: rose from junior researcher to Head of Quantum Machine Learning Engineering in four years, architected the company's no-code quantum ML platform (QAI Hub) and its quantum ML library (TQml), and led delivery of 20+ paid enterprise projects in energy, healthcare, manufacturing, materials and finance. Earned a PhD in quantum machine learning.

At a glance

Research impact	20+ publications, 15 peer-reviewed; 1,068 citations; h-index 12 (Google Scholar)
Inventions	3 granted US patents + 3 pending US applications
Products	Architect of 2 commercial quantum products at Terra Quantum (QAI Hub, TQml); founder of EigenOrbit
Industry delivery	20+ paid enterprise quantum projects across 6+ sectors
Recognition	Wiley Top Viewed Article (2023); front cover of *Advanced Quantum Technologies* (2023); paper with 357 citations in 2 years; 2× national physics olympiad silver medalist

Experience

Founder & CEO — EigenOrbit

Luxembourg (HQ) · Oct 2026 – present

Founded EigenOrbit to build the independent decision and orchestration layer for quantum and hybrid computing: it tells enterprises which problems are worth solving on quantum hardware, on which machine, and always against a classical baseline.

- Shipped six products: eigenkit, an open-source Python library that runs one codebase across 8 simulators and 4 hardware routes (IBM, IQM, Amazon Braket and Quandela); Benchmarks, one workload measured across 8 simulators and priced across 14 QPUs; Adviser, AI-assisted decomposition of industrial problems; Router, one API key for QPUs from multiple vendors; Academy, video courses on quantum computing with quizzes and a certificate; and QUASAR, a research system for validated quantum advantage.
- eigenkit and its accompanying paper were covered by The Quantum Insider, Quantum Computing Report, Quantum Business Magazine (Japan) and QTC (China).

Terra Quantum AG — 6 years 9 months

Munich, Germany · Dec 2019 – Aug 2026 · junior researcher to Head of Quantum ML Engineering in four years

Head of Quantum Machine Learning Engineering · Feb 2024 – Aug 2026

- Architected QAI Hub, the company's no-code quantum ML platform in TQ42 Studio, with an agentic AI assistant (TQ Copilot) that selects quantum layers and tunes hyperparameters.
- Led R&D of TQml, the quantum ML library behind Terra Quantum's commercial products and client deliveries.
- Led delivery of 20+ paid enterprise projects in energy, healthcare, manufacturing, materials and finance, each with KPIs agreed with the client. Results include 40%+ lower solar power forecasting error and blast-furnace temperature control in steelmaking with 25%+ higher prediction accuracy, narrowing temperature variance from ±50° to ±7.6°.
- Built and managed an international R&D team of 10+ scientists and engineers: hiring, mentoring, roadmap.

Lead Quantum Machine Learning Researcher · Feb 2022 – Feb 2024

- Led and mentored a team of junior and mid-level scientists developing new hybrid quantum-classical algorithms.
- Co-developed a hybrid model reaching a record 99.21% accuracy on MNIST with 8× fewer parameters than its classical counterpart (357 citations).
- Co-developed hybrid quantum physics-informed neural networks with 21% higher accuracy than classical networks for 3D fluid simulation.

Quantum Machine Learning Scientist · Mar 2021 – Feb 2022

- Applied hybrid quantum models to client and research tasks: drug response prediction, image classification, fluid dynamics; reinforcement learning for QKD protocols.

Junior Researcher, Quantum Cryptography Group · Dec 2019 – Mar 2021

- Error correction algorithms and reinforcement learning for quantum key distribution; co-inventor on the long-distance QKD patents, later granted. Joined while still an undergraduate.

Lecturer — Moscow Institute of Physics and Technology (MIPT)

Moscow · Aug 2019 – Sep 2022

- Taught physics and mathematics at the Phystech International Olympiad School; university courses in informatics and Python.

Education

All three degrees at the Moscow Institute of Physics and Technology (MIPT), Department of General and Applied Physics. Admitted without entrance exams as a national physics olympiad medalist.

Degree	Years	Thesis	Supervisor
PhD, Applied Mathematics and Physics	2022 – 2025	Quantum Machine Learning Models	Prof. Alexey Melnikov
MSc, Applied Mathematics and Physics	2020 – 2022	Quantum Machine Learning Models	Prof. Alexey Melnikov
BSc, Applied Mathematics and Physics	2016 – 2020	Error Correction Algorithms in Quantum Cryptography	Dr Dmitry Kronberg

Honours and awards

Year	Award
2023	Wiley Top Viewed Article, *Advanced Quantum Technologies*: among the journal's most-viewed papers published in 2023
2023	Front cover, *Advanced Quantum Technologies* 6(8)
2015, 2016	Silver medal, Kazakhstan National (Republican) Physics Olympiad, twice
2015 – 2016	Member, national physics team of the Republic of Kazakhstan

Patents

Three granted US patents in quantum communication and three pending US applications in quantum machine learning (Justia).

Patent	Title	Status	Co-inventors
US 12,689,503	Method for determining a quantum communication setup	Granted Jul 2026	N. Kenbayev, P. Sekatski, A. Melnikov
US 12,149,615	Long-distance quantum key distribution	Granted Nov 2024	N. Kirsanov, N. Kenbayev, D. Kronberg, V. Vinokur, G. Lesovik, P. Sekatski

Patent	Title	Status	Co-inventors
US 11,818,258	Method and system for quantum key distribution	Granted Nov 2023	G. Lesovik, D. Kronberg, A. Kodukhov, V. Pastushenko, et al.
US 2026/0235996	Computer-implemented method and control system to set control parameters	Pending (filed 2026)	A. Melnikov
US 2025/0245542	Assigning a label to an input vector of features using quantum computation	Pending (filed 2023)	M. Kordzanganeh, A. Melnikov
US 2024/0311670	Hybrid quantum-classical system for classifying images and training method	Pending (filed 2024)	A. Senokosov, A. Sedykh, A. Melnikov

Publications

22 publications, 15 of them peer-reviewed; 1,068 citations; h-index 12. Citation counts from Google Scholar, November 2026.

Peer-reviewed

1. V. Lopatkin, **A. Sagingalieva**, L. Lusnig, T. Protasevich, B. Behnke, et al. Quantum hybrid feature selector. *EPJ Quantum Technology* 13(1), 49 (2026).
2. A. Benoit, T. Ivas, M. Papierz, **A. Sagingalieva**, A. Melnikov, E. Iseli. A fast and accurate Fourier neural operator-based surrogate for melt-pool prediction in laser processing. *Journal of Intelligent Manufacturing*, 1–20 (2026).
3. O. Tsurkan, A. Konstantinova, A. Senokosov, **A. Sagingalieva**, A. Melnikov. Hybrid quantum recurrent neural network for remaining useful life prediction of turbofan engines. *Algorithms* 19(8), 663 (2026).
4. G. Laskaris, D. Morozov, D. Tarpanov, A. Seth, J. Procelewska, G. S. Gautam, et al. Multi-objective optimization and quantum hybridization of equivariant deep learning interatomic potentials. *Computational Materials Science* 270, 114742 (2026).
5. **A. Sagingalieva**, S. Komornyik, A. Senokosov, A. Joshi, C. Mansell, O. Tsurkan, K. Pinto, M. Pflitsch, A. Melnikov. Photovoltaic power forecasting using quantum machine learning. *Solar Energy* 302, 114016 (2025). 40%+ lower forecasting error than the strongest baselines. *52 citations.*
6. **A. Sagingalieva**, L. Lusnig, F. Cavalli, A. Melnikov. Hybrid quantum neural networks for computer-aided sex diagnosis in forensic and physical anthropology. *Informatics in Medicine Unlocked* 58, 101682 (2025).
7. M. Anoshin, **A. Sagingalieva**, C. Mansell, D. Zhiganov, V. Shete, M. Pflitsch, A. Melnikov. Hybrid quantum cycle generative adversarial network for small molecule generation. *IEEE Transactions on Quantum Engineering* 5, 2500514 (2024). *57 citations.*

8. A. Sedykh, M. Podapaka, **A. Sagingalieva**, K. Pinto, M. Pflitsch, A. Melnikov. Hybrid quantum physics-informed neural networks for simulating computational fluid dynamics in complex shapes. *Machine Learning: Science and Technology* 5(2), 025045 (2024). 21% higher accuracy than classical networks. *72 citations.*
9. L. Lusnig, **A. Sagingalieva**, M. Surmach, T. Protasevich, O. Michiu, et al. Hybrid quantum image classification and federated learning for hepatic steatosis diagnosis. *Diagnostics* 14(5), 558 (2024). *58 citations.*
10. A. Senokosov, A. Sedykh, **A. Sagingalieva**, B. Kyriacou, A. Melnikov. Quantum machine learning for image classification. *Machine Learning: Science and Technology* 5(1), 015040 (2024). Record 99.21% on MNIST with 8× fewer parameters. *357 citations.*
11. **A. Sagingalieva**, M. Kordzanganeh, A. Kurkin, A. Melnikov, D. Kuhmistrov, et al. Hybrid quantum ResNet for car classification and its hyperparameter optimization. *Quantum Machine Intelligence* 5(2), 38 (2023). *62 citations.*
12. M. Kordzanganeh, M. Buchberger, B. Kyriacou, M. Povolotskii, W. Fischer, et al., incl. **A. Sagingalieva**. Benchmarking simulated and physical quantum processing units using quantum and hybrid algorithms. *Advanced Quantum Technologies* 6(8), 2300043 (2023). Wiley Top Viewed Article; front cover. *66 citations.*
13. N. S. Kirsanov, V. A. Pastushenko, A. D. Kodukhov, M. V. Yarovikov, **A. B. Sagingalieva**, et al. Forty thousand kilometers under quantum protection. *Scientific Reports* 13, 8756 (2023). *23 citations.*
14. **A. Sagingalieva**, M. Kordzanganeh, N. Kenbayev, D. Kosichkina, T. Tomashuk, A. Melnikov. Hybrid quantum neural network for drug response prediction. *Cancers* 15(10), 2705 (2023). *154 citations.*
15. **A. B. Sagingalieva**, D. A. Kronberg. Adaptive algorithms of error correction and error estimation in quantum cryptography. *AIP Conference Proceedings* 2362, 050002 (2021).

Preprints

1. L. Domingo, D. Tarpanov, A. Senokosov, **A. Sagingalieva**. eigenkit: a provider-neutral quantum computing library. arXiv:2611.02979 (2026).
2. L. Monbroussou, M. Periyasamy, V. Kuzmin, P. Sekatski, V. Patapovich, et al., incl. **A. Sagingalieva**. Hybrid quantum neural networks: theory, implementations, and applications. arXiv:2608.01194 (2026).
3. M. Papierz, **A. Sagingalieva**, A. Benoit, T. Ivas, E. Iseli, A. Melnikov. Hybrid Fourier neural operator for surrogate modeling of laser processing with a quantum-circuit mixer. arXiv:2604.04828 (2026).
4. N. Lee, M. Shin, **A. Sagingalieva**, A. Senokosov, M. Anoshin, A. J. Tripathi, K. Pinto, A. Melnikov. Predictive control of blast furnace temperature in steelmaking with hybrid depth-infused quantum neural networks. arXiv:2504.12389 (2025).
5. A. Sedykh, T. Protasevich, M. Surmach, A. Senokosov, M. Anoshin, et al., incl. **A. Sagingalieva**. Multi-stream physics hybrid networks for solving Navier–Stokes equations. arXiv:2504.01891 (2025).
6. M. Perelshtein, **A. Sagingalieva**, K. Pinto, V. Shete, A. Pakhomchik, et al. Practical application-specific advantage through hybrid quantum computing. arXiv:2205.04858 (2022). *51 citations.*

7. N. S. Kirsanov, N. R. Kenbaev, **A. B. Sagingalieva**, D. A. Kronberg, V. M. Vinokur, et al. Long-distance quantum key distribution based on the physical loss control. arXiv:2105.00035 (2021).

Talks, service and skills

Talks. 20+ invited and contributed talks and posters at international conferences since 2020, including the ML & Quantum Physics Workshop (Obergurgl) and an industry talk at the University of St. Gallen with the ACM Chapter HSG (2024), and a hands-on quantum machine learning workshop with the Oxford Quantum Society (2026).

Peer review. Referee for *Physical Review Letters*, *Physical Review A*, *Physical Review Applied* and *Machine Learning: Science and Technology*.

Quantum computing. Hybrid quantum-classical neural networks, variational circuits, quantum kernels, quantum-enhanced optimisation, classical simulation of quantum circuits, quantum key distribution.

Machine learning. Deep learning, CNNs and GNNs, recurrent sequence models, GANs, physics-informed neural networks, transfer and federated learning.

Product and leadership. Quantum software products, no-code platform architecture, Python SDK and library design, enterprise delivery, building and leading international R&D teams.