

# Dr. Johannes S. Otterbach

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## PROFESSIONAL DEVELOPMENT

<b>Co-Founder &amp; CTO</b> <i>nyonic, Berlin, Germany</i>	06/2023 - present
<b>Scientific AI Advisor to Deltia</b> <i>Deltia, Berlin, Germany</i>	10/2023 - present
<b>Scientific AI Advisor to Genova.ai</b> <i>genova.ai, Berlin, Germany</i>	08/2023 - present
<b>Scientific AI Advisor to projectquench.io</b> <i>projectquench.io, San Francisco, CA</i>	07/2023 - present
<b>VP of Machine Learning Research</b> <i>Merantix Momentum, Berlin, Germany</i>	04/2021 - 05/2023
<b>Scientific AI Advisor to Syntegra.io</b> <i>Syntegra.io, San Francisco, CA</i>	10/2019 - present
<b>Machine Learning Researcher</b> <i>OpenAI, San Francisco, CA</i>	06/2018 - 02/2021
<b>Research Scientist and Software Engineer</b> <i>Rigetti Quantum Computing, Berkeley, CA</i>	04/2017 - 05/2018
<b>Senior Data Scientist</b> <b>Data Scientist</b> <i>LendUp, San Francisco, CA</i>	12/2016 - 03/2017 08/2015 - 11/2016
<b>Infrastructure Quality Engineer (Machine Learning)</b> <i>Palantir Technologies, London, UK (until 1/2015) and Palo Alto, CA</i>	4/2014 - 7/2015
<b>Postdoctoral Research Fellow (Theoretical Quantum Physics)</b> <i>Harvard Quantum Optics Center, Cambridge, MA</i>	9/2011 - 3/2014

## EDUCATION

<b>Ph.D. in Physics, GPA: 4.0 with distinction, 10/2011</b> Theoretical Quantum Optics Group of Prof. Dr. M. Fleischhauer University of Kaiserslautern, Germany
<b>MSc. (Diploma) in Physics, GPA: 3.93, 5/2008</b> University of Kaiserslautern, Germany

## SCHOLARSHIPS AND AWARDS

OpenAI Fellowship	2018
Prize Fellowship of the Harvard Quantum Optics Center	2011-2013
2011 Award of the Friends of the University of Kaiserslautern for an outstanding scientific performance as a Ph.D. student in physics	2012
2009 Young Talent Award (Nachwuchspreis) of the Department of Physics of the TU Kaiserslautern for an outstanding MSc thesis	2009
Foundation of German Business scholarship	2005-2008

## LANGUAGE SKILLS

German: Native speaker. English: Fluent. Swedish and French: Basic

## PUBLICATION LIST

Also see: <https://scholar.google.com/citations?user=yZS4ce8AAAAJ&hl=en&authuser=1>

1. M. Schambach, D. Paul, J. Otterbach, *Scaling Experiments in Self-Supervised Cross-Table Representation Learning*, TRL @ NeurIPS 2023, arxiv:2309.17339
2. J. Siems, K. Ditschuneit, W. Ripken, A. Lindborg, M. Schambach, J. S. Otterbach, M. Genzel, *Curve Your Enthusiasm: Concurvity Regularization in Differentiable Generalized Additive Models*, IMLH @ ICML 2023, arxiv:2305.11475
3. O. Kondrateva, S. Dietzel, M. Schambach, J. S. Otterbach, B. Scheuermann, *Filling the Gap: Fault-Tolerant Updates of On-Satellite Neural Networks Using Vector Quantization*, Networking '23: 22nd IFIP Networking Conference
4. A. Koenig, M. Schambach, J. S. Otterbach, *Uncovering the Inner Workings of STEGO for Safe Unsupervised Semantic Segmentation* Accepted at SAIAD @ ICCV 2023, arxiv:2304.07314
5. J. Siems, M. Schambach, S. Schulze, J. S. Otterbach, *Interpretable Reinforcement Learning via Neural Additive Models for Inventory Management*, AI4ABM @ ICLR 2023 workshop, arxiv:2303.10382
6. K. Ditschuneit, A. Frenk, M. Frings, V. Rudel, S. Dietzel, J. S. Otterbach, *NAM-CAM: Neural-Additive Models for Semi-Analytic Descriptions of CAM Simulations*, Accepted at the FAIM 2023.
7. LEAM:AI consortium, *Große KI-Modelle für Deutschland (in German only)*, On behalf of the Federal Ministry for Economic Affairs and Climate Action (BMWK)
8. J. S. Otterbach, C. M. Wilson, M. P. da Silva, N. A. Tezak, G. E. Crooks, *Using a quantum processor unit to preprocess data*, Patent number: US-11551127-B1
9. M. J. Reagor, B. R. Johnson, M. P. da Silva, J. S. Otterbach, N. A. Tezak, C. T. Rigetti, *Utilizing multiple quantum processor unit (QPU) instances*, Patent number: US-11521103-B1
10. R. S. Smith, N. C. Rubin, J. S. Otterbach, *Quantum state blockchain*, Patent number: US-11477015-B1
11. W. Löttsch, S. Ohler & J. S. Otterbach *Learning the Solution Operator of Boundary Value Problems using Graph Neural Networks*, 2nd AI4Science Workshop at the 39th ICML 2022, arxiv:2206.14092
12. S. Ohler, D. S. Brady, W. Löttsch, M. Fleischhauer & J. S. Otterbach, *Towards Learning Self-Organized Criticality of Rydberg Atoms using Graph Neural Networks*, 2nd AI4Science Workshop at the 39th ICML 2022
13. K. Ditschuneit, & J. Otterbach, *Auto-Compressing Subset Pruning for Semantic Image Segmentation*, arXiv:2201.11103
14. D. Sreenivasiah, J. Otterbach & T. Wollmann, *MEAL: Manifold Embedding-based Active Learning*, 2021 IEEE/CVF International Conference on Computer Vision Workshops (ICCVW), 2021, pp. 1029-1037, doi: 10.1109/ICCVW54120.2021.00120.
15. S. v. Baußnern<sup>†</sup>, J. Otterbach<sup>†</sup>, A. Loy, M. Salzmann & T. Wollmann, *DAAIN: Detection of Anomalous and Adversarial Input using Normalizing Flows*, arxiv:2105.14638
16. J. Otterbach & T. Wollmann, *Chameleon: A Semi-AutoML framework targeting quick and scalable development and deployment of production-ready ML systems for SMEs*, arxiv:2105.03669 (Accepted at KI-KMU 2021)
17. J. Otterbach, J. Ward, M. P. da Silva, N. C. Rubin, *Selecting parameters for a quantum approximate optimization algorithm (QAOA)*, Patent number: 10846366 (USA).
18. C. M. Wilson, J. Otterbach & Rigetti Computing, *Quantum Kitchen Sinks: An algorithm for machine learning on near-term quantum computers*, arxiv:1806.08321
19. S. Caldwell & Rigetti Computing *Parametrically-Activated Entangling Gates Using Transmon Qubits*, Physical Review Applied 10 (3), 034050 (2018).
20. M. Reagor & Rigetti Computing, *Demonstration of Universal Parametric Entangling Gates on a Multi-Qubit Lattice*, Science Advances, 4, eaao3603 (2018)
21. J. Otterbach & Rigetti Computing, *Unsupervised Machine Learning on a Hybrid Quantum Computer*, arxiv:1712.05771
22. Q. Wang, J. Otterbach, S. F. Yelin *Interacting in-plane molecular dipoles in a zig-zag chain*, Phys. Rev. A 96, 043615 (2017)

23. J. Otterbach & M. Lemeshko, *Dissipative Preparation of Spatial Order in Rydberg-Dressed Bose-Einstein Condensates*, Phys. Rev. Lett. 113, 070401 (2014).
24. F. Bariani, J. Otterbach, H. Tan, P. Meystre, *Single-atom quantum control of macroscopic mechanical oscillators*, Phys. Rev. A 89, 011801(R) (2014).
25. J. Otterbach, M. Moos, D. Muth, M. Fleischhauer, *Wigner Crystallization of Single Photons in Cold Rydberg Ensembles*, Phys. Rev. Lett. 111, 113001 (2013).
26. E. G. Dalla Torre, J. Otterbach, E. Demler, V. Vuletic, M. D. Lukin, *Dissipative Preparation of Spin Squeezed Atomic Ensembles in a Steady State*, Phys. Rev. Lett. 110, 120402 (2013).
27. S. D. Bennett, N. Y. Yao, J. Otterbach, P. Zoller, P. Rabl, M. D. Lukin, *Phonon-induced spin-spin interactions in diamond nanostructures: application to spin squeezing*, Phys. Rev. Lett. 110, 156402 (2013).
28. M. J. Edmonds, J. Otterbach, R. G. Unanyan, M. Fleischhauer, M. Titov, P. Öhberg, *From Anderson to anomalous localization in cold atomic gases with effective spin-orbit coupling*, New J. Phys. 14, 073056 (2012).
29. J. Ruseckas, V. Kudriasov, G. Juzeliunas, R. G. Unanyan, J. Otterbach, M. Fleischhauer, *Photonic band-gap properties for two-component slow light*, Phys. Rev. A 83, 063811 (2011).
30. A. V. Gorshkov, J. Otterbach, M. Fleischhauer, T. Pohl, M. D. Lukin, *Photon-Photon Interactions via Rydberg Blockade*, Phys. Rev. Lett. 107, 133602 (2011).
31. D. Petrosyan, J. Otterbach, and M. Fleischhauer, *Electromagnetically induced transparency with Rydberg atoms*, Phys. Rev. Lett. 107, 213601 (2011).
32. J. Otterbach, J. Ruseckas, R. G. Unanyan, G. Juzeliunas, and M. Fleischhauer, *Effective magnetic fields for stationary light*, Phys. Rev. Lett. 104, 033903 (2010).
33. A. V. Gorshkov, J. Otterbach, E. Demler, M. Fleischhauer, and M. D. Lukin, *Photonic Phase Gate via an Exchange of Fermionic Spin Waves in a Spin Chain*, Phys. Rev. Lett. 105, 060502 (2010).
34. R. G. Unanyan, J. Otterbach, M. Fleischhauer, J. Ruseckas, V. Kudriasov, and G. Juzeliunas, *Spinor Slow-Light and Dirac particles with variable mass*, Phys. Rev. Lett. 105, 173603 (2010).
35. J. Otterbach, R. G. Unanyan, M. Fleischhauer, *Confining stationary light: Dirac dynamics and Klein tunneling*, Phys. Rev. Lett. 102, 063602 (2009).
36. R. G. Unanyan, J. Otterbach, M. Fleischhauer, *Confinement Limit of Dirac particles in scalar 1D potentials*, Phys. Rev. A 79, 044101 (2009).
37. F. E. Zimmer, J. Otterbach, R. G. Unanyan, B. W. Shore, M. Fleischhauer, *Dark-State Polaritons for multi-component and stationary light fields*, Phys. Rev. A 77, 063823 (2008).
38. M. Fleischhauer, J. Otterbach, R. G. Unanyan, *Bose-Einstein condensation of stationary-light polaritons*, Phys. Rev. Lett. 101, 163601 (2008).