

# Curriculum Vitæ

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Name	<b>Johannes Fankhauser</b>
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## Education

<b>2018 – 2023</b>	<b>PhD in Quantum Foundations</b> , <a href="#">University of Oxford</a> , Faculty of Philosophy, St Edmund Hall. Title of thesis: <a href="#">Observability and Predictability in Quantum and Post-Quantum Physics</a> . Advisors: Christopher G. Timpson, Owen J. E. Maroney. Examiners: Jonathan Barrett, Guido Bacciagaluppi.
<b>2016 – 2017</b>	<b>MSt in Philosophy of Physics</b> , <a href="#">University of Oxford</a> , Faculty of Philosophy, Magdalen College, <i>highest essay grade among MSt students</i> .
<b>2015 – 2018</b>	<b>MSc in Physics</b> , <a href="#">ETH Zurich</a> , Department of Physics, <i>top 10% of cohort</i> . Title of MSc thesis: <i>Is the World Just Wavefunction? Determinism and the metaphysics of hidden variables in quantum mechanics</i> . Advisor: Renato Renner. Title of semester thesis: <i>Brains, incompleteness and objective wave collapse</i> . Advisors: Renato Renner, Norman Sieroka.
<b>2012 – 2015</b>	<b>BSc in Physics</b> , <a href="#">ETH Zurich</a> , Department of Physics, <i>top 5% of cohort</i> . Title of semester thesis: <i>Design, simulation and measurement of tuneable Transmon qubit in 3D-Cavity</i> . Advisors: Andreas Wallraff, Philipp Kurpiers ( <a href="#">Quantum Device Lab</a> ). 5 <sup>th</sup> semester: <a href="#">KTH Stockholm</a> , Swiss-European Mobility Program.
<b>2007 – 2012</b>	<b>HTL–Jenbach</b> , Engineering School, Final Grade: 1.0, <i>vaedictorian</i> . Diploma project: <i>Development and construction of a ball-balancing robot</i> .

## Professional experience

<b>Dec. 2024 - present</b>	<b>Postdoctoral Researcher</b> , <a href="#">Quantum Information and Computation Group</a> , Institute for Theoretical Physics, University of Innsbruck, Austria.
<b>Mar. 2023 - Dec. 2024</b>	<b>Postdoctoral Researcher</b> , <a href="#">Mathematical Physics Group</a> , Institute for Theoretical Physics, University of Innsbruck, Austria.

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2020 - Dec. 2022	<b>College Tutor</b> , University of Oxford, United Kingdom.
2019 - present	<b>Consultant</b> (working at 10% FTE), <a href="#">Austrian Study Foundation</a> (co-initiated), Austrian Academy of Sciences, Vienna, Austria.
2019 - 2020	<b>Teaching Assistant</b> , University of Lausanne and EPF Lausanne, Switzerland.
2015 - 2018	<b>Teaching Assistant</b> , ETH Zurich, Switzerland.

### Research interests

My research interests lie in the **foundations and philosophy of quantum mechanics**, **quantum information theory**, and the **foundations and philosophy of space and time**.

The overarching research vision is to understand what quantum theory tells us about the nature of reality, and the intertwined relationship between knowledge and reality, i.e. how what we can know constrains what we can say about what *is*.

During my doctoral research, I primarily worked on foundational questions related to quantum paradoxes, indeterminacy, observability, and predictability in quantum and post-quantum theories. I have also extensively explored topics such as quantum uncertainty, pilot wave theory, delayed choice quantum eraser experiments, quantum post-selection, and questions related to weak measurements. A central result investigated was whether quantum uncertainty is fundamental or if post-quantum theories could offer predictive advantage while respecting operational constraints such as no-signalling.

I have also engaged with foundational aspects of spacetime physics, particularly gravitational redshift effects, where I clarify the implications of the Pound-Rebka experiment and the role of special relativity in describing these phenomena.

In my first postdoctoral project, I investigated the emergence of *epistemic horizons* in deterministic settings, resembling quantum theory's uncertainty principle. By modelling embedded information-gathering agents, the study shows that even deterministic dynamics can give rise to limits on what can be known or predicted. This work has seeded a broader research trajectory centred on agency in physics, and how the structure of the observer shapes physical theory.

Going forward, I am focused on formalising the *inseparability of subject and object* in physical theories, studying how it results in measurement uncertainty in classical mechanics, quantum mechanics, and intermediate theories such as Spekkens' toy model. I am especially committed to developing a nuanced account of the role of agents in physics. This includes an interest in the possibility of an *observer-participatory* understanding of quantum reality without adopting an associated anti-realist stance.

### Selected publications (in reverse chronological order)

1. J. Fankhauser, T. Gonda, and G. de les Coves, *Epistemic Horizons From Deterministic Laws: Lessons From a Nomic Toy Theory*, *Synthese* **205**, 136 (2025). DOI: [10.1007/s11229-024-04852-0](https://doi.org/10.1007/s11229-024-04852-0), Preprint: arXiv:[2406.17581](https://arxiv.org/abs/2406.17581) [quant-ph]
2. J. Fankhauser, *The (un)detectability of trajectories in pilot-wave theory*, in A. Oldofredi, (ed.), *Guiding Waves in Quantum Mechanics: One Hundred Years of de Broglie-Bohm Pilot-Wave Theory*.

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Chapter 9. Oxford University Press, Oxford (2025). DOI: [10.1093/oso/9780198901853.003.0010](https://doi.org/10.1093/oso/9780198901853.003.0010),  
Preprint: arXiv:[2503.07694](https://arxiv.org/abs/2503.07694) [quant-ph]

3. J. Fankhauser, *Epistemic Boundaries and Quantum Indeterminacy: What Local Observers Can (Not) Predict*, *Quantum* **8**, 1518 (2024). DOI: [10.22331/q-2024-11-07-1518](https://doi.org/10.22331/q-2024-11-07-1518),  
Preprint: arXiv:[2310.09121](https://arxiv.org/abs/2310.09121) [quant-ph, physics.hist-ph]
4. J. Fankhauser, J. Read, *Gravitational redshift revisited: inertia, geometry, and charge*, *Studies in History and Philosophy of Science* **108** (2024). DOI: [10.1016/j.shpsa.2024.09.001](https://doi.org/10.1016/j.shpsa.2024.09.001),  
Preprint: arXiv:[2309.10499](https://arxiv.org/abs/2309.10499) [gr-qc, physics.hist-ph]
5. J. Fankhauser, P. M. Dürr, *How (not) to Understand Weak Measurements of Velocities*, *Studies in History and Philosophy of Science* **85** (2021). DOI: [10.1016/j.shpsa.2020.12.002](https://doi.org/10.1016/j.shpsa.2020.12.002),  
Preprint: arXiv:[2309.10395](https://arxiv.org/abs/2309.10395) [quant-ph, physics.hist-ph]
6. J. Fankhauser, *Taming the Delayed Choice Quantum Eraser*, *Quanta* **8** (2019).  
DOI: [10.12743/quanta.v8i1.88](https://doi.org/10.12743/quanta.v8i1.88), Preprint: arXiv:[1707.07884](https://arxiv.org/abs/1707.07884) [quant-ph]

### Teaching experience

2021 - 2022	<b>Tutor in Physics</b> , Tutorials, classes and collections for first-year undergraduate physics students, University of Oxford.
2021	<b>Tutor in Advanced Philosophy of Physics</b> , Tutorials for graduate students, University of Oxford.
2020 - 2021	<b>Tutor in Intermediate Philosophy of Physics</b> , Tutorials for undergraduate philosophy and physics students, and visiting students, University of Oxford.
2020 - present	<b>Tutor in Physics for Gifted Pupils</b> , Summer academies and courses for A-level students, Initiative Education, Vorarlberg, Austria.
2019	<b>Supervisor and Tutor</b> , Classes and tutorials for the Master's course 'Philosophy, Epistemology and History of Science II', EPF Lausanne.
2018	<b>Teaching Assistant</b> , Exam preparation courses for undergraduate students in physics, ETH Zurich.
2015 - 2016	<b>Teaching Assistant</b> , Tutorials and classes for undergraduate physics and science students, ETH Zurich.

### Selected additional activities

1. **Member** of the [Basic Research Community for Physics \(BRCP\)](#) (since 2026).
2. **Fellow** of the [Swiss Study Foundation](#) (2015-2023).
3. **Tutor in Physics** for gifted pupils, organising yearly summer academies (*quantum physics at your fingertips*) and courses for A-level students for the project *Brain Train*, [Initiative Begabung](#), Vorarlberg, Austria (since 2020).

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4. **Referee** for *Foundations of Physics, Quantum, Philosophy of Science, Journal for General Philosophy of Science* and *Studies in the History and Philosophy of Science* (and more since 2020).
  5. Organised various workshop on interdisciplinary and philosophical topics for the Swiss Study Foundation, Zurich (2017-2022).
  6. **Co-Initiator** of the [Austrian Study Foundation](#).

### Talks and conferences

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| <b>May 2026</b>   | Conceptual foundations of QFT, Vienna (Austria).   |
| <b>Apr. 2026</b>  | A Radical Experiment   Between Art and Science, Museo delle Arti Carrara (Italy), <i>Invited Scientist</i> , <a href="http://www.cresci.art">www.cresci.art</a> .  |
| <b>Apr. 2026</b>  | BRCP Annual Meeting, Vienna (Austria).   |
| <b>Nov. 2025</b>  | Oxford Quantum Centenary Conference: What Quantum?, Oxford (UK), <i>Invited Discussant</i> .   |
| <b>Sept. 2025</b> | Probability in Philosophy and Science, Graz (Austria), Talk: <i>Epistemic Horizons and Physical Agents: Quantum Probabilities from a First-Person Realist Perspective</i> .  |
| <b>Sept. 2025</b> | Innsbruck-Konstanz-Hannover Meeting on Physics and Philosophy, Maria Waldraat (Austria), Talk: <i>The physics of agents and knowledge</i> .  |
| <b>Aug. 2025</b>  | Stromboli Summer Research Intensive, Stromboli (Italy), Project: <i>Unsplitting the World: Rethinking the subject-object divide in quantum physics</i> .   |
| <b>Jul. 2025</b>  | The 22 <sup>nd</sup> European Conference on Foundations of Physics, Gdańsk (Poland), Talk: <i>Epistemic Horizons from Deterministic Laws: Lessons from a Nomic Toy Theory</i> .  |
| <b>Jun. 2025</b>  | 100 Years of Quantum Mechanics, Helgoland (Germany), Presentation: <i>Epistemic Boundaries and Quantum Uncertainty: What Local Observers Can (Not) Predict</i> .   |
| <b>Apr. 2025</b>  | QISS Conference Vienna 25, Institute for Quantum Optics and Quantum Information, Vienna (Austria).   |
| <b>Sept. 2024</b> | Innsbruck-Konstanz-Hannover Meeting on Physics and Philosophy, Maria Waldraat (Austria), Talk: <i>Epistemic Horizons from Deterministic Laws: Lessons from a Nomic Toy Theory</i> .  |
| <b>Sept. 2024</b> | Vienna Quantum Foundations Conference, Institute for Quantum Optics and Quantum Information, Vienna (Austria), Presentation: <i>Epistemic Boundaries and Quantum Uncertainty: What Local Observers Can (Not) Predict</i> . |
| <b>Jul. 2024</b>  | Quantum Foundations Seminar, Perimeter Institute for Theoretical Physics, Waterloo (Canada), Talk: <i>Epistemic Horizons From Deterministic Laws: Lessons From a Nomic Toy Theory</i> .                                    |
| <b>Jul. 2024</b>  | Müller Group, Institute for Quantum Optics and Quantum Information, Vienna (Austria), Talk: <i>Epistemic Horizons From Deterministic Laws: Lessons From a Nomic Toy Theory</i> .   |

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- Jul. 2024** Emergence of Classicality: New Perspectives on Measurements in Quantum Theory, Trinity College Dublin, Talk: *Epistemic Horizons From Deterministic Laws: Lessons From a Nomic Toy Theory*.
- Jun. 2024** Kefalonia Foundations 2024: Theoretical and Conceptual Foundations of Quantum Physics, Kefalonia (Greece).
- Nov. 2023** University of Innsbruck (Austria), Network of Young Scientists and Engineers (NYSE), Talk: *Why Physics Needs Philosophy*.
- Nov. 2023** Müller Group, Institute for Quantum Optics and Quantum Information, Vienna (Austria), Talk: *Epistemic Boundaries, Quantum Indeterminacy, and the Subject-Object Split*.
- Sept. 2023** Rethinking the Foundations of Physics, Center for Advanced Studies, LMU Munich (Germany), Talk: *Epistemic Boundaries and Quantum Indeterminacy: What Local Observers Can (Not) Predict*.
- Aug. 2023** The Quantum Reconstruction Program and Beyond: What it Is, Why it Matters, Where Next?, University of Graz (Austria), Talk: *Quantum Uncertainty as a Fundamental Limit to Nature's Predictability*.
- Jul. 2023** 21<sup>st</sup> European Conference on Foundations of Physics, University of Bristol (UK), Presentation: *Unravelling Quantum Indeterminacy: What Local Observers Can (Not) Predict*.
- May 2023** Philosophy of Physics Seminar, University of Oxford (UK), Talk: *Quantum Uncertainty as a Fundamental Limit to Nature's Predictability*, [www.youtube.com/watch?v=prefg5grPjk&t=2471s](http://www.youtube.com/watch?v=prefg5grPjk&t=2471s).
- May 2023** New Directions in the Foundations of Physics, Camera di Commercio, Viterbo (Italy).
- Mar. 2023** Foundations of Observational, Classical and Semi-Classical Gravitational Physics and The Problem of Agency and Laws of Nature, LMU Munich (Germany).
- Feb. 2023** It's About Time (Clubhouse Podcast), Talk: *Quantum Uncertainty and Empirical Completeness*, [www.clubhouse.com/room/PYzQ6G4E](http://www.clubhouse.com/room/PYzQ6G4E).
- Jan. 2023** De las Cuevas Group, Institute for Theoretical Physics, University of Innsbruck (Austria), Talk: *Quantum Empirical Completeness*.
- Dec. 2022** BBLOC Graduate Philosophy of Physics Workshop, King's College London (UK), Talk: *The Empirical Completeness Problem of Quantum Mechanics*.
- Aug. 2022** Quantum Epistemology Beyond Quantum Measurement (QEBQM), Early Career Summer Seminar, University of Washington, Pack Forest conference centre (USA), Talk: *The Empirical Completeness Problem of Quantum Mechanics*.
- Jun. 2022** The Quantum, the Thermal and the Gravitational Reconciled: Physics and Philosophy in the Varied Landscape of the Intersections, LMU Munich (Germany).
- Jun. 2021** Philosophy of Physics Graduate Seminar, University of Oxford (UK), Talk: *On the Colbeck-Renner theorem*.
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- Nov. 2020** Philosophy of Physics Graduate Seminar, University of Oxford (UK),  
Talk: *The empirical completeness problem of quantum mechanics.*
- Jul. 2019** Tsirelson Memorial Workshop, IQOQI Vienna (Austria).
- Jul. 2019** The Chimera of Entropy II, John Bell Institute, Split (Croatia).
- Jun. 2019** Quantum Information Revolution: Impact to Foundations, Linnaeus University,  
Växjö (Sweden).
- May 2019** Quantum Group Day, University of Oxford (UK), Talk: *Weak measurements and  
Bohmian Mechanics.*
- Feb. 2019** Philosophy of Physics Graduate Seminar, University of Oxford (UK),  
Talk: *How we ought (not) to understand weak measurements of Bohmian velocities.*
- 2019** Philosophy of Physics Graduate Seminar, University of Oxford (UK),  
Talk: *Taming the delayed choice quantum eraser.*
- Jan. 2019** The Flute & the Bowl (Science and art project), Ruskin School of Art in Oxford  
(UK), Talk: *Philosophy of Physics and Quantum Weirdness.*
- Oct. 2018** Ockham Society, University of Oxford (UK), Talk: *Is the World Just Wavefunction?  
Determinism and the metaphysics of hidden variables in quantum mechanics.*
- Jul. 2018** First Biennial Midwest Summer School in Philosophy of Physics, University of  
Illinois at Chicago (USA), Presentation: *Wigner's friend scenarios.*
- Jul. 2018** The Chimera of Entropy, The Seventh Physics & Philosophy Meeting, John Bell  
Institute, Split (Croatia).
- May 2018** Università della Svizzera italiana, Lugano (Switzerland), Talk: *Is the wavefunc-  
tion all there is? On the metaphysics of hidden variables.*
- Jan. 2018** Renner Group, Quantum Information Theory, ETH Zurich (Switzerland), Talk:  
*Is the World Just Wavefunction? Determinism and the metaphysics of hidden variables  
in quantum mechanics.*
- Oct. 2017** Swiss Study Foundation, Interdisciplinary Study Day Fribourg (Switzerland),  
Talk: *Philosophy of Physics and Quantum Weirdness.*
- Jul. 2017** 5<sup>th</sup> International Summer School in Philosophy of Physics, Black Forest, Saig  
(Germany), Talk: *Gravitational Redshift, Inertia, and the Role of Charge.*
- May 2017** Philosophy of Physics Graduate Seminar, University of Oxford (UK),  
Talk: *Gravitational Redshift and the Role of Charge.*
- Mar. 2017** The Foundation of Reality: Fundamentality, Space and Time, The Metaphysics  
of Entanglement project, University of Oxford (UK).
- 2016** Renner Group, Quantum Information Theory, ETH Zurich (Switzerland), Talk:  
*Brains, incompleteness and objective wave collapse.*
- Sept. 2015** Time in Physics, ETH Zurich (Switzerland).
- 2015** Wallraff Group, Quantum Device Lab, ETH Zurich (Switzerland),  
Talk: *Design, simulation and measurement of tuneable Transmon qubit in 3D-Cavity.*
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