

# Nuriya Nurgalieva

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CONTACT INFORMATION	Institute for Theoretical Physics ETH Zurich Wolfgang-Pauli-Strasse 27 8093 Zurich Switzerland	nuriya@phys.ethz.ch theoryverse.com
PERSONAL DATA	Born October 20, 1995 in Kazan, Russia. Native speaker of Russian and Tatar; fluent in English; proficient in German.	
RESEARCH INTERESTS	Quantum foundations, epistemic logic, quantum information theory, quantum thermodynamics, resource theories, quantum computing, foundations of quantum intelligence, quantum gravity.	
EMPLOYMENT	<b>ETH Zurich</b> , Switzerland PhD student and teaching assistant, 2018 - present (expected graduation August 2023). - Principal Investigator: Renato Renner (quantum information theory group).	
EDUCATION	<b>ETH Zurich</b> , Switzerland Master degree (M. Sc. ETH Zurich), Physics, 2018. <ul style="list-style-type: none"><li>• Overall grade: 5.72 (out of 6). Thesis grade: 6.</li><li>• Thesis: <i>Logic of agents in quantum settings</i>.</li><li>• Thesis supervisors: Lidia del Rio and Renato Renner (ETH Zurich).</li></ul> <b>Moscow Institute of Physics and Technology (MIPT)</b> , Russia Bachelor degree with honors (B. Sc.), Applied Physics and Mathematics, 2016. <ul style="list-style-type: none"><li>• Overall grade: 9.7 (out of 10). Thesis grade: 10.</li><li>• Thesis: <i>Implementation of simplest Boolean operations (yes/no) for detection of low-mass molecules on the base of lateral flow immunoassay</i>.</li><li>• Thesis supervisors: Maxim Nikitin (MIPT).</li></ul>	
PUBLICATIONS	<b>Published</b>  Ladina Hausmann, NN and Lidia del Rio, <i>Toys can't play: physical agents in Spekkens' theory</i> , New J. Phys. 25, 023018, DOI: 10.1088/1367-2630/acb3ef (2023).  NN and Renato Renner, <i>Testing quantum theory with thought experiments</i> , Contemporary Physics, 61(3), 193-216, DOI: 10.1080/00107514.2021.1880075 (2021).  V. Vilasini, NN and Lidia del Rio, <i>Multi-agent paradoxes beyond quantum theory</i> , New J. Phys. 21, 113028, DOI: 10.1088/1367-2630/ab4fc4, arXiv:1904.06247 (2019).  NN and Lidia del Rio, <i>Inadequacy of modal logic in quantum settings</i> , EPTCS 287, pp. 267-297, DOI: 10.4204/EPTCS.287.16 (2019).	

## To appear (arXiv)

Ralph Silva, NN and Henrik Wilming, *A single axiom for ticking clocks*, to appear on arXiv in June 2023.

NN, Ralph Silva and Renato Renner, *Reconstructing the waiting time of a clock using the simplest possible reference*, to appear on arXiv in June 2023.

NN, Simon Mathis, Lída del Rio and Renato Renner, *Thought experiments in a quantum computer*. DOI: 10.48550/ARXIV.2209.06236 (2022).

Ladina Hausmann, NN and Lída del Rio, *A consolidating review of Spekkens' toy theory*. arXiv:2105.03277 (2021).

Patrick Fraser, NN and Lída del Rio, *Fitch's knowability axioms are incompatible with quantum theory*, arXiv:2009.00321 (2020).

## CONFERENCES

### Invited talks

- *Thought experiments on a quantum computer*, Essentia Foundation conference, online (November 2022).
- *Testing quantum theory with thought experiments*, Quantum Information workshop, Lyon, France (June 2022).
- *Testing quantum theory with thought experiments*, BNL Quantum Computing journal club, Brookhaven National Laboratory, USA (December 2021).
- *Thought experiments on a quantum computer*, Complete the Retreat workshop, YIRG IQOQI, Vienna, Austria (October 2021).
- *Thought experiments on a quantum computer*, ETH Quantum Center flagship event, ETH Zurich, Switzerland (September 2021).
- *Grover's algorithm*, Open Source Quantum Computing Workshop, ETH Zurich, Switzerland (June 2019).
- *Observers as Primitives*, Foundations of Quantum Mechanics Workshop, Perimeter Institute, Waterloo, Canada (August 2018).

### Contributed talks

- *Multi-agent paradoxes and contextuality*, QPL 2023, Paris, France (July 2023).
- *How to characterize a clock using the simplest reference*, QPL 2023, Paris, France (July 2023).
- *Thought experiments in a quantum computer*, Foundations of Physics conference, Bristol, UK (July 2023).
- *Putting clocks against each other: how to characterize a clock*, Time in Quantum Theory conference, Vienna, Austria (September 2022).
- *Thought experiments on a quantum computer*, QPL 2022, University of Oxford, UK (June 2022).
- *Inadequacy of modal logic in quantum settings*, YQIS, University of Vienna, Vienna, Austria (September 2018).
- *Inadequacy of modal logic in quantum settings*, 15th International Conference on Quantum Physics and Logic, Dalhousie University, Halifax, Canada (June 2018).

## Posters

- *Phenomenological thermodynamics of multiple conserved quantities*, Quantum Thermodynamics conference, Vienna, Austria (July 2023).
- *Putting clocks against each other: how to characterize a clock*, QIP, University of Ghent, Belgium (February 2023).
- *Thought experiments on a quantum computer*, QIP, California Institute of Technology, USA (March 2022).
- *Fitch's knowability axioms are incompatible with quantum theory*, QPL, ICTQT, University of Gdansk, Poland (June 2021).
- *Inadequacy of modal logic in quantum settings*, Summer School on Mathematical Philosophy, LMU, Munich, Germany (July 2019).
- *Inadequacy of modal logic in quantum settings*, QIP, University of Boulder, Colorado, USA (January 2019) - Best Poster Award.
- *Inadequacy of modal logic in quantum settings*, The 13th Conference on the Theory of Quantum Computation, Communication and Cryptography, University of Sydney, Sydney, Australia (July 2018).
- *Inadequacy of modal logic in quantum settings*, Quantum2Classical, University of Strathclyde, Glasgow, UK (June 2018).
- *Quantum Reference Frames for Experiments where Observers are Measured*, Quantum Networks Workshop, University of Oxford, Oxford, UK (August 2017).

## Talks in group seminars during scientific visits

- 2023: University of Bristol (UK).
- 2022: German Physical Society, during Quantum Computing school (Germany).
- 2021: IQOQI, Vienna (Austria).
- 2020: University of Innsbruck (Austria).
- 2018: University of Oxford (UK), University of Cambridge (UK), University of York (UK).

## EVENTS ORGANIZATION

- Together with Lidia del Rio: Theory of Quantum Computation, Communication and Cryptography (TQC), Aveiro, Portugal (July 2023) <https://tqc-conference.org/>.
- Together with Lidia del Rio: Solstice of Foundations - a summer school on quantum foundations, Zurich, Switzerland (June 2022) [foundations.ethz.ch](https://foundations.ethz.ch).
- Together with IMPRS Munich: QWIZ, a joint workshop between ETH and IMPRS PhD students, online (September 2021) [qwiz.ethz.ch](https://qwiz.ethz.ch).
- Together with Lidia del Rio and Elise Raphael: Quantum Thermodynamics summer school, Les Diablerets, Switzerland (August 2021) [qthermo.ethz.ch](https://qthermo.ethz.ch).
- Together with Lidia del Rio: QuID - Quantum Information for developers, summer school and hackathon, Zurich, Switzerland (September 2019) [quid.ethz.ch](https://quid.ethz.ch).
- Together with Lidia del Rio: Solstice of Foundations - a summer school on quantum foundations, Zurich, Switzerland (June 2019) [foundations.ethz.ch](https://foundations.ethz.ch).
- Together with Lidia del Rio: Open Source Quantum Computing Workshop - ETH Zurich, Switzerland (June 2019).
- Joint with Russian Quantum Center: Quantum hackathon for The First Academic School on Quantum Communications, Sochi, Russia (February 2019).

- Together with Lidia del Rio: QuID - Quantum Information for developers, summer school and hackathon, Zurich, Switzerland (September 2018) [quid.ethz.ch](http://quid.ethz.ch).

SUPERVISION OF STUDENTS

**ETH Zurich**

- Co-supervisor with Lidia del Rio and Renato Renner:
  - Ladina Hausmann, *Phenomenological thermodynamics of a black hole* (Master thesis, 2020-2021).
  - Simon Mathis, *Thought experiments on quantum computer* (semester project, 2019).
  - Ladina Hausmann, *On multi-agent logical paradoxes in epistemically-restricted hidden variable theories* (semester project, 2020).
  - Oliver Knapp, *SU(2) symmetry and reference frames* (semester project, 2020).
  - Anne-Catherine de la Hamette, *Quantum reference frames from quantum communication* (semester project, 2019).
  - Romain Moyard, *Path integral formalism and quantum foundations* (semester project, 2019).
- Co-supervisor with Lidia del Rio and Joe Renes:
  - Xinyang She, Davide Materia, Alessandro Bruno, *Benchmarking quantum programming languages through Shor's algorithm* (quantum engineering semester workshop, 2020).

TEACHING EXPERIENCE

**ETH Zurich**

- Teaching assistant for the courses of General Relativity, Quantum Information Processing, Philosophical Aspects of Quantum Mechanics, Electrodynamics, Quantum Physics for Non-Physicists, Advanced Topics in Quantum Information (2018 - present).

GRANTS AND AWARDS

**Moscow Institute of Physics and Technology**

- Recipient of the study scholarship with distinction (2012 - 2016).
- Prizewinner of the MIPT Physics Olympiad for students (2014, 2015).

**High school**

- Winner and runner-up in numerous regional and national competitions in Physics, Maths, Chemistry and Literature.

EXTRA-CURRICULAR ACTIVITY

- Co-founder of SQUID, a non-profit for organizing summer schools and workshops in quantum physics ([squids.ch](http://squids.ch)).
- Volunteer and interpreter (Russian/English/German) for social workers in Zurich (AOZ and Zurich main station).