

# JONAS NÜßLEIN

I am currently a PhD student at LMU Munich. My research topics include Combinatorial Optimization and its symbiosis with Reinforcement Learning and Deep Neural Networks to learn representations for unstructured NP-complete problems.

## CONTACT

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## EDUCATION

**B.SC IN COMPUTER SCIENCE AND THEORETICAL PHYSICS (I.1)** 2016 – 2019

Title of the thesis: Inference on Bayes Networks via Quantum Annealing

**M.SC IN COMPUTER SCIENCE (I.2)** 2019 – 2021

Title of the thesis: Reinforcement Learning for arbitrary target observations

## WORKING EXPERIENCE

**INTERN – BSI (BUNDESAMT FÜR SICHERHEIT IN DER INFORMATIONSTECHNIK)** 2019

The BSI is the national cyber security agency of Germany. I completed a 3-month internship with a main focus on intrusion detection.

**RESEARCH ASSISTENT – LMU MUNICH** 2019 - 2021

I created improved problem representations for combinatorial search algorithms.

**PHD STUDENT AND RESEARCH ASSOCIATE – LMU MUNICH** 2021 – NOW

I specialized in combinatorial optimization and its symbiosis with reinforcement learning and deep neural networks.

## SELECTED PUBLICATIONS

### Algorithmic QUBO formulations for k-SAT and Hamiltonian Cycles

Jonas Nüßlein, Thomas Gabor, Claudia Linnhoff-Popien, Sebastian Feld

GECCO 2022

### Mapping Quantum Circuits to modular architectures with QUBO

Medina Bandic, Luise Prielinger, Jonas Nüßlein, Anabel Ovide, Santiago Rodrigo, Sergi Abadal, Hans van Someren, Gayane Vardoyan, Eduard Alarcon, Carmen G Almudever, Sebastian Feld

2023 IEEE International Conference on Quantum Computing and Engineering (QCE)

### Solving (max) 3-SAT via quadratic unconstrained binary optimization

Jonas Nüßlein, Sebastian Zielinski, Thomas Gabor, Claudia Linnhoff-Popien, Sebastian Feld

ICCS 2023

### Black box optimization using QUBO and the cross entropy method

Jonas Nüßlein, Christoph Roch, Thomas Gabor, Jonas Stein, Claudia Linnhoff-Popien, Sebastian Feld

ICCS 2023

### Evidence that PUBO outperforms QUBO when solving continuous optimization problems with the QAOA

Jonas Stein, Farbod Chamanian, Maximilian Zorn, Jonas Nüßlein, Sebastian Zielinski, Michael Kölle, Claudia Linnhoff-Popien

GECCO 2023

### Attention-based recurrence for multi-agent reinforcement learning under stochastic partial observability

Thomy Phan, Fabian Ritz, Philipp Altmann, Maximilian Zorn, Jonas Nüßlein, Michael Kölle, Thomas Gabor, Claudia Linnhoff-Popien

ICML 2023

### Case-Based Inverse Reinforcement Learning Using Temporal Coherence

Jonas Nüßlein, Steffen Illium, Robert Müller, Thomas Gabor, Claudia Linnhoff-Popien

ICCBR 2022

### CROP: towards distributional-shift robust reinforcement learning using compact reshaped observation processing

Philipp Altmann, Fabian Ritz, Leonard Feuchtinger, Jonas Nüßlein, Claudia Linnhoff-Popien, Thomy Phan

IJCAI 2023

### Emergent Cooperation from Mutual Acknowledgment Exchange in Multi-Agent Reinforcement Learning

Thomy Phan, Felix Sommer, Fabian Ritz, Philipp Altmann, Jonas Nüßlein, Michael Kölle, Lenz Belzner, Claudia Linnhoff-Popien

AAMAS 2022

### The Effect of Penalty Factors of Constrained Hamiltonians on the Eigenspectrum in Quantum Annealing

Christoph Roch, Daniel Ratke, Jonas Nüßlein, Thomas Gabor, Sebastian Feld

ACM Transactions on Quantum Computing 2023

### NISQ-ready community detection based on separation-node identification

Jonas Stein, Dominik Ott, Jonas Nüßlein, David Bucher, Mirco Schönfeld, Sebastian Feld

Journal on Mathematics 2023

## TEACHING

Teaching Assistant for the lecture <i>Quantum Applications</i>	S22
Teaching Assistant for the lecture <i>Intelligent Systems</i>	W22, W23
Seminar Mobile and Distributed Systems	W21, S22, W22, S23, W23, S24
Practical Course Quantum Computing	S22, W22
Practical Course Autonomous Systems	S23, W23, S24