

# Andreas Bluhm

## Curriculum Vitae

### Personal details

Name **Andreas Bluhm**  
Birth **April 5, 1990 in Kiel, Germany**  
Nationality **German**  
Affiliation **Université Grenoble Alpes, CNRS, Grenoble INP, LIG**  
Address **CS 40700 - 38058 Grenoble Cedex 9**  
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### Research interests

Quantum information theory, quantum spin systems

### Research experience

- 01/11/2022 - **Research scientist**, *LIG, CNRS, Grenoble INP, Université Grenoble Alpes*, Grenoble, France  
present
- 01/09/2019 - **Postdoctoral researcher**, *QMATH, Department of Mathematical Sciences, University of Copenhagen*, Copenhagen, Denmark  
31/08/2022  
Mentor: Prof. Matthias Christandl
- 01/10/2015 - **Research assistant**, *Department of Mathematics, Technical University of Munich*, Munich, Germany  
31/08/2019

### Academic qualifications

- 01/10/2015 - **Doctoral studies in Mathematics**, *Technical University of Munich*, Munich, Germany. PhD  
31/08/2019 awarded on 01/08/2019  
Thesis: Compression and measurements in quantum information theory  
Advisor: Prof. Michael M. Wolf
- 01/10/2013 - **Master's degree in Theoretical and Mathematical Physics**, *Ludwig Maximilian University of Munich*, Munich, Germany  
30/09/2015  
Thesis: On the area law for the entropy of entanglement for gapped systems  
Supervisor: Prof. Sven Bachmann
- 01/10/2010 - **Bachelor's degree in Physics**, *University of Rostock*, Rostock, Germany  
30/09/2013  
Thesis: The separability eigenvalue problem for bound entangled states  
Supervisor: Dr. Jan Sperling
- 01/09/2012 - **Exchange semester**, *Université Bordeaux I*, Bordeaux, France  
31/01/2013 Erasmus program
- 17/06/2009 **Abitur (German high school diploma)**, *Hebbelschule Kiel*, Kiel, Germany

### Selected research stays

- 20/01/2025 **Prof. Marius Lemm's group**, *University of Tübingen*, Tübingen, Germany. One week  
11/11/2024 **JProf. Ramona Wolf's group**, *University of Siegen*, Siegen, Germany. One week  
11/03/2024 **Prof. Renato Renner's group**, *ETH Zurich*, Zurich, Switzerland. One week

- 04/12/2023 **Prof. Karol Życzkowski's group**, Jagiellonian University, Krakow, Poland. One week
- 13/11/2023 **JProf. Ángela Capel**, University of Tübingen, Tübingen, Germany. One week
- 09/10/2023 **Prof. Igor Klep**, University of Ljubljana, Ljubljana, Slovenia. One week
- 22/05/2023 **Dr. Cambyse Rouzé**, Technical University of Munich, Munich, Germany. One week
- 13/02/2023 **Dr. Ion Nechita and Dr. Victor Magron**, Université Paul Sabatier and LAAS-CNRS, Toulouse, France. Two weeks
- 18/04/2022 **Dr. Ion Nechita**, Université Paul Sabatier, Toulouse, France. One week
- 27/09/2021 **Prof. Michael M. Wolf's group**, Technical University of Munich, Munich, Germany. One week
- 14/10/2019 **Prof. Nilanjana Datta's group**, University of Cambridge, Cambridge, UK. One week
- 11/02/2019 **Dr. Omar Fawzi's group**, École Normale Supérieure de Lyon, Lyon, France. One week
- 19/11/2018 **Dr. Ion Nechita**, Université Paul Sabatier, Toulouse, France. One week
- 15/10/2018 **Dr. Marcus Huber's group**, IQOQI, Vienna, Austria. One week
- 09/07/2018 **Prof. Maria Jivulescu**, Universitatea Politehnica, Timișoara, Romania. One week
- 04/06/2018 **Prof. David Pérez-García's group**, Universidad Complutense, Madrid, Spain. One week
- 01/09/2017 - **Trimester on Analysis in Quantum Information Theory**, Institut Henri Poincaré, Paris, France  
17/12/2017

## Grants and scholarships

- 01/10/2025 **JCJC grant of the French National Research Agency (ANR)**  
Research grant for young researchers of 320 000€ until end of 2029. Project: *Practical quantum position verification* (PraQPV)
- 30/07/2023 **Short Research Stays at the SwissMAP Research Station**  
Grant for 2 weeks research stay in Les Diablerets, Switzerland
- 16/05/2023 **Research Initiatives at Grenoble Alpes (IRGA)**  
Research grant of 11 000€ until end of 2024. Project: *Non-commutative polynomial optimization methods for quantum information theory* (POQIT)
- 18/02/2019 **Wilhelm and Else Heraeus-Foundation**  
Travel grant for the DPG spring meeting
- 13/02/2017 **Wilhelm and Else Heraeus-Foundation**  
Travel grant for the DPG spring meeting
- 01/05/2014 - **Scholarship "Max-Weber-Programm" (Scholarship awarded by the state of Bavaria,**  
30/09/2015 **Germany)**
- 01/02/2011 - **Scholarship "Studienstiftung des Deutschen Volkes" (German National Academic**  
30/09/2015 **Foundation)**

## Prizes

- 12/06/2023 **LAA Early Career Speaker**  
at the 25th workshop of the International Linear Algebra Society in Madrid, Spain

## Conferences and workshops

- 18/12/2024 **Workshop "Correlations of quantum many-body systems"**, *Strong decay of correlations for Gibbs states in any dimension*, Tübingen, Germany
- 12/09/2024 **19th Conference on the Theory of Quantum Computation, Communication and Cryptography**, *Hamiltonian Property Testing*, Okinawa, Japan
- 12/09/2024 **19th Conference on the Theory of Quantum Computation, Communication and Cryptography**, *Dissipation-enabled bosonic Hamiltonian learning via new information-propagation bounds*, Okinawa, Japan, talk given by coauthor Tim Möbus

- 22/08/2024 **26th International Symposium on Mathematical Theory of Networks and Systems**, *Computing noise robustness of incompatible quantum measurements*, Cambridge, UK, invited
- 05/07/2024 **XXI International Congress on Mathematical Physics**, *Hamiltonian Property Testing*, Strasbourg, France
- 09/05/2024 **Workshop “Towards Infinite Dimension and Beyond in Quantum Information”**, *Unified framework for continuity of sandwiched Rényi divergences*, Granada, Spain, invited
- 19/01/2024 **27th Annual Conference on Quantum Information Processing**, *Towards a unification of different measures of correlations and locality in Gibbs states*, Taipei, Taiwan, talk given by coauthor Ángela Capel
- 18/01/2024 **27th Annual Conference on Quantum Information Processing**, *Making existing quantum position verification protocols secure against arbitrary transmission loss*, Taipei, Taiwan, talk given by coauthor Philip Verduyn Lunel
- 17/01/2024 **27th Annual Conference on Quantum Information Processing**, *Going beyond gadgets: The importance of scalability for analogue quantum simulators*, Taipei, Taiwan, talk given by coauthor Dylan Harley
- 09/01/2024 **Conference “Quantum Information Theory and Free Probability”**, *Quantifying the incompatibility of quantum measurements*, Abu Dhabi, United Arab Emirates, invited
- 02/10/2023 **QuantAlps Days 2023**, *Secure quantum position verification*, Grenoble, France, invited
- 21/09/2023 **Workshop “Advances in quantum position verification”**, *Making existing quantum position verification protocols secure against arbitrary transmission loss*, Waterloo, Ontario, Canada, invited
- 13/07/2023 **Workshop “The multiple facets of quantum cloning”**, *Programmability of covariant quantum channels*, Toulouse, France, invited
- 19/06/2023 **Group meeting of Eric Chitambar’s quantum information theory group**, *Free spectrahedra in quantum information theory*, Urbana-Champaign, Illinois, USA, invited, online
- 12/06/2023 **25th workshop of the International Linear Algebra Society**, *Free spectrahedra in quantum information theory*, Madrid, Spain, invited
- 14/02/2023 **Scientific day Quantum IMT-LAAS-LPT**, *Matrix convex sets in quantum information theory: Measurement compatibility and beyond*, Toulouse, France, invited
- 24/10/2022 **QInfo day**, *Position-based cryptography: Single-qubit protocol secure against multi-qubit attacks*, Lyon, France, invited
- 12/07/2022 **17th Conference on the Theory of Quantum Computation, Communication and Cryptography**, *Position-based cryptography: Single-qubit protocol secure against multi-qubit attacks*, Urbana-Champaign, Illinois, USA, online
- 31/05/2022 **QuantAlgo workshop**, *Position-based cryptography: Single-qubit protocol secure against multi-qubit attacks*, Brussels, Belgium
- 08/03/2022 **25th Annual Conference on Quantum Information Processing**, *Exponential Decay of Mutual Information for Gibbs states of local Hamiltonians*, Pasadena, California, USA, talk given by coauthor Ángela Capel
- 02/09/2021 **21st Asian Quantum Information Science Conference**, *Position-based cryptography: Single-qubit protocol secure against multi-qubit attacks*, Tokyo, Japan, online
- 27/08/2021 **11th Annual Conference on Quantum Cryptography**, *Position-based cryptography: Single-qubit protocol secure against multi-qubit attacks*, Amsterdam, Netherlands, online
- 06/08/2021 **International Congress on Mathematical Physics 2021**, *Some applications of free spectrahedra to quantum information theory*, Geneva, Switzerland, talk given by coauthor Ion Nechita (invited)
- 07/06/2021 **18th International Conference on Quantum Physics and Logic**, *Maximal violation of steering inequalities and the matrix cube*, Gdansk, Poland, online (unscheduled talk)

- 08/12/2020 **20th Asian Quantum Information Science Conference**, *Incompatibility in general probabilistic theories, generalized spectrahedra, and tensor norms*, Sydney, Australia, online
- 13/02/2020 **Workshop on relativistic quantum information theory**, *Towards easier protocols for quantum position-verification*, Cambridge, UK, invited
- 05/08/2019 **6th International Conference on Continuous Optimization**, *Compatibility of quantum measurements and inclusion constants for free spectrahedra*, Berlin, Germany, invited
- 02/07/2019 **Workshop Generalized Probabilistic Theories and Quantum Information**, *A strengthened data processing inequality for the Belavkin-Staszewski relative entropy*, Lyon, France, invited
- 15/05/2019 **Workshop II: Operator Algebras, Groups and Applications to Quantum Information**, *Compatibility of quantum measurements and inclusion constants for free spectrahedra*, Madrid, Spain
- 13/03/2019 **DPG spring meeting**, *Compatibility of quantum measurements and inclusion of free spectrahedra*, Rostock, Germany
- 14/01/2019 **22nd Annual Conference on Quantum Information Processing**, *Compatibility of quantum measurements and inclusion constants for free spectrahedra*, Boulder, Colorado, USA
- 14/06/2018 **15th Central European Quantum Information Processing Workshop**, *Quantum compression relative to a set of measurements*, Smolenice, Slovakia
- 14/03/2017 **DPG spring meeting**, *Lossless quantum compression of quantum measurements*, Bremen, Germany
- 22/07/2016 **Summer school Stochastic Methods in Quantum Mechanics**, *Local factorisation of the dynamics of quantum spin systems*, Autrans, France

**Posters** Contributions to conferences and workshops in the form of posters were presented at **19th Conference on the Theory of Quantum Computation, Communication and Cryptography**, Okinawa, Japan, 2024; **27th Annual Conference on Quantum Information Processing**, Taipei, Taiwan, 2024; **18th Central European Quantum Information Processing Workshop**, Smolenice, Slovakia, 2023; **20th International Conference on Quantum Physics and Logic**, Paris, France, 2023; **26th Annual Conference on Quantum Information Processing**, Ghent, Belgium, 2023; **IAMP - EMS Summer School in Mathematical Physics**, Munich, Germany, 2022; **5th Seefeld Workshop on Quantum Information**, Seefeld, Austria, 2022; **25th Annual Conference on Quantum Information Processing**, Pasadena, California, USA, 2022; **21st Asian Quantum Information Science Conference**, Tokyo, Japan, 2021 (online); **16th Conference on the Theory of Quantum Computation, Communication and Cryptography**, Riga, Latvia, 2021 (online); **24th Annual Conference on Quantum Information Processing**, Munich, Germany, 2021 (online); **Quantum Information Theory and Mathematical Physics 2018**, Budapest, Hungary, 2018; **21st Annual Conference on Quantum Information Processing**, Delft, Netherlands, 2018; **Conference on Quantum Information Theory**, Paris, France, 2017; **12th Conference on the Theory of Quantum Computation, Communication and Cryptography**, Paris, France, 2017

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## Teaching experience

**Introduction to University Pedagogy**, *Course at the University of Copenhagen*, 3 ECTS

### Lecturer

Quantum Information Theory

### Teaching assistant

Analysis 1 & 2 for Physicists, Vector Analysis, Differential Topology, Quantum Operations, Mathematics 2 for Economists, Analysis 3 for Electrical Engineers, Introduction to Representation Theory

### Co-supervisor

1 PhD student (since November 2024), 2 Master's theses, 3 Bachelor's theses, 1 summer student

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## Other activities

### **Technical program committee**

28th Annual Conference on Quantum Information Processing 2025, Raleigh, North Carolina, USA  
Beyond IID in Information Theory 2024, Urbana-Champaign, Illinois, USA

### **Journal reviewer**

Communications in Mathematical Physics, IEEE Journal on Selected Areas in Information Theory, IEEE Transactions on Information Theory, International Journal of Theoretical Physics, International Mathematics Research Notices, Journal of Mathematical Physics, Journal of Physics A: Mathematical and Theoretical, Journal of Physics Communications, Letters in Mathematical Physics, Physical Review A, Physical Review Letters, PRX Quantum, Quantum, Quantum Information Processing, SIAM Journal on Optimization

### **Conference subreviewer**

Annual Conference on Quantum Information Processing, Asian Quantum Information Science Conference, Conference on the Theory of Quantum Computation, Communication and Cryptography, IEEE International Symposium on Information Theory, Innovations in Theoretical Computer Science, International Symposium on Mathematical Theory of Networks and Systems

### **Outreach**

Seminar week of the L3 computer science students at ENS Lyon, MFML workshop at LIG, laboratory days at LIG, Grenoble Quantum Dates

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## Languages

German	Native speaker
English	Fluent (CEF C1 diploma)
French	Excellent command (CEF B2 diploma)
Spanish	Very good command (CEF B2 diploma)
Danish	Very good command (CEF B2 diploma)
Swedish	Good command (CEF B2 diploma)
Russian	Basic command (CEF A2 diploma)

Grenoble, January 24, 2025

Andreas Bluhm