# Andreas Bluhm

*Curriculum Vitae*

## Personal details

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| 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** |
| Email | **andreas.bluhm@univ-grenoble-alpes.fr** |

## Research interests

Quantum information theory, quantum spin systems

## Research experience

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

## Academic qualifications

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

## Selected research stays

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|---|---|
| 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*, Timişoara, Romania. One week |
| 04/06/2018 | **Prof. David Pérez-García's group**, *Universidad Complutense*, Madrid, Spain. One week |
| 01/09/2017 - 17/12/2017 | **Trimester on Analysis in Quantum Information Theory**, *Institut Henri Poincaré*, Paris, France |

## Grants and scholarships

| 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 - 30/09/2015 | **Scholarship "Max-Weber-Programm" (Scholarship awarded by the state of Bavaria, Germany)** |
| 01/02/2011 - 30/09/2015 | **Scholarship "Studienstiftung des Deutschen Volkes" (German National Academic 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

| 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 |

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| 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 |

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| 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 **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 |

## 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**

3 Bachelor's thesis, 2 Master's thesis, 1 summer student

## Other activities

**Technical program committee**

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, Letters in Mathematical Physics, Physical Review A, 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

**Outreach**

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

## Languages

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| German | Native speaker |
| English | Fluent (CEF C1 diploma) |

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| 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, April 19, 2024

Andreas Bluhm