

# Atul Singh ARORA

## PERSONAL

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## RESEARCH

- Current* | PhD Thesis, UNIVERSITÉ LIBRE DE BRUXELLES (ULB), Belgium  
*Quantum Cryptography and Communication*  
Advisor: Prof. Jérémie ROLAND  
Recently solved an interesting problem about quantum weak coin flipping, a cryptographic primitive. Started studying for the next project, quantum communication complexity. On the side, have been investigating foundational aspects of quantum mechanics.  
A.S.A., S. Weis, J. Roland. [arXiv:1811.02984](https://arxiv.org/abs/1811.02984) (accepted at QIP; submitted to STOC)  
K. Bharti, A.S.A., L. C. Kwek, J. Roland. [arXiv:1811.05294](https://arxiv.org/abs/1811.05294) (submitted to PRL)
- 2015-16 | Master's Thesis, INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (IISER), MOHALI, India  
*Contextuality in a Deterministic Quantum Theory*  
Advisor: Prof. Arvind  
Concluded that contextuality is not a necessary feature of quantum mechanics and proposed an alternative, non functional-consistency, bolstered by an explicit construction.  
A.S.A., K. Bharti, Arvind. [arXiv:1607.03498](https://arxiv.org/abs/1607.03498) (submitted to Physics Letters A)
- SUMMER 2015 | Intern, UNIVERSITY OF SIEGEN, Germany  
*Towards a macroscopic test of local realism*  
Advisor: Prof. Otfried GÜHNE  
Constructed a Bell inequality using observables bounded in phase space to probe local realism using macroscopic variables.  
A.S.A., A. Asadian. [Phys. Rev. A 92, 061207](https://arxiv.org/abs/1607.03498)
- 2011-14 | Intern, worked on yarn defect recognition using OpenCV at INDIAN INSTITUTE OF TECHNOLOGY (IIT), BOMBAY under the supervision of Prof Anirban Guha; worked on setting up an experiment to study the dynamics of a dipole lattice at the NATIONAL PHYSICAL LABORATORY (NPL), New Delhi, India under the supervision of Dr Ravi Mehrotra; worked on quantum simulation at IISER MOHALI, India under the supervision of Prof Arvind;

## EDUCATION

- present* | Doctorat en Sciences de l'ingénieur et technologie,  
OCT 2016 | **Université libre de Bruxelles (ULB)**, Belgium.
- JULY 2016 | Bachelor and Master of Science with PHYSICS major,  
JULY 2011 | **Indian Institute of Science Education and Research (IISER)**, Mohali, India.  
CPI: 9.4 /10. Graduated with *rank two*. [| Details at the end](#)

## RECOGNITION

- DEC 2016 Two year research fellowship from the Belgian *FNRS (Fonds National Recherche de Science)*, through the FRIA grant.
- 2016 Top 5% in the physics stream of the *Graduate Aptitude Test in Engineering (GATE)*, India.  
Obtained a 92.3 percentile in the national graduate physics exam, *Joint Entrance Screening Test (JEST)*, India.
- 2015 Awarded the *Junior Research Fellowship (JRF-NET)* from the Council of Scientific and Industrial Research, India.  
Awarded the *DAAD WISE* fellowship for a summer internship by and in Germany.
- 2013-16 Awarded the Certificate of Merit for the best academic performance in a semester, twice by IISER. Was among the highest scorers four other times.
- 2012 Awarded the *KVPY* fellowship for my work on Stepper Motor Control, by DST, India.
- 2010 Granted financial support for attending the Bright Green Youth climate summit, Denmark.

## LANGUAGES

- HINDI: Fluent
- ENGLISH: Fluent
- PUNJABI: Intermediate
- FRENCH: Basic

## TEACHING

- 2019 (scheduled) Teaching Assistant. Information Quantique (graduate). ULB, Brussels.
- 2016 Teaching Assistant. Thermodynamics (undergraduate). IISER, Mohali.
- 2015 Teaching Assistant. Classical Mechanics (undergraduate). IISER, Mohali.

## CONFERENCES

- 2018 QUANTALGO Workshop, Université Paris-Diderot, Paris. Talk. *Quantum Weak Coin Flipping beyond bias 1/6*.
- 2018 QIP, TU Delft. Poster. *Quantum Weak Coin Flipping with bias 1/10*.
- 2017 TQC, Paris. Attended.

## INTERESTS & EXTRACURRICULAR

Technology, Open-Source, Programming;  
Philosophy—Ethics, Books—non-fiction;  
Fitness; Piano, Guitar.

**QUIC-MEETS** — *Organizer*. A fortnightly department meet to facilitate collaboration. Status: Pilot.

**C'EST ÇA** — *Editor*. An at least bilingual peer-reviewed popular science journal. Status: Initialising.

**GLEANED** — *Author*. Collection of my book summaries. Status: Pilot.

**DONKEYDOCS** — *Contributor*. A repository of lecture notes. Status: Initialising.

## Bachelor and Master of Science with a major in PHYSICS

SEMESTER*	SUBJECTS	SCORE
1	Mechanics, Chemistry of elements and chemical transformations, Cellular basis of life, Symmetry, Language skills B (English), Introduction to computers, Physics lab I, Chemistry lab I, Biology lab I	8.5/10
2	Electromagnetism, Atoms molecules and symmetry, Gene expression and development, Analysis in one variable, Hands-on electronics, History of science, Physics lab II, Chemistry lab II, Biology lab II	8.6/10
3	Waves and optics, Spectroscopic and other physical methods, Genetics and evolution, Curves and surfaces, Introduction to astrophysics, Workshop training, Physics lab III, Chemistry lab III, Biology lab III	8.8/10
4	Thermodynamics and statistical physics, Energetics and dynamics of chemical reactions, Behaviour and ecology, Probability and statistics, Introduction to quantum physics, Philosophy of science, Physics lab IV, Chemistry lab IV, Biology lab IV	9.7/10
5 <sup>†</sup>	Classical mechanics, Quantum mechanics, Electrodynamics, Advanced optics lab, Reason and rationality	10/10
6	Statistical mechanics, Atomic and molecular physics, Quantum computation, Advanced electronics and instrumentation lab, Quantum field theory	9.6/10
7	Solid state physics, Nuclear and particle physics, Nuclear physics lab, Physics of fluids, Quantum principles and quantum optics, Radiative effects and renormalisation group in relativistic quantum field theory	9.4/10
8	Nonlinear dynamics, Chaos and complex systems, Condensed matter physics lab, computational methods in physics, Standard model and beyond, Selected topics in classical and quantum mechanics	9.5/10
9	Ethics, MS Thesis—Research project I	10/10
10	Cosmology and galaxy formation, MS Thesis—Research project II	10/10
Cumulative Performance Index (CPI)		9.4 /10

\* Note that the credits associated with each semester are not exactly the same.

† Physics major henceforth.