Gabriel Oliveira Alves

Website: alves-gabriel.github.io/
Email: gabriel2.alves@usp.br
GitHub: github.com/alves-gabriel

Education

University of São Paulo — São Paulo, Brazil
Msc. in Quantum Information and Quantum Thermodynamics — 2020 –Current

University of São Paulo — São Paulo, Brazil
Bsc. in Molecular Sciences, GPA: 8.4/10 — 2016–2020

Federal Institute of São Paulo — São Paulo, Brazil
Certificate in Electronics — 2013–2015

Experience

University of São Paulo — São Paulo, Brazil
Msc. Student **Advidsor:** Dr. Gabriel Teixeira Landi — August 2020 -

- Quantum Metrology
- The details of the thesis are still to be defined. We expect to study quantum metrology in the context of collisional models, quantum thermodynamics and stochastic master equations.

University of São Paulo — São Paulo, Brazil
Undergraduate Researcher **Advidsor:** Dr. Gabriel Teixeira Landi — August 2018 - August 2020

- Weak Measurements and Stochastic Master Equations (August 2019 - August 2020)
- We studied the formalism of stochastic processes in quantum mechanics and how to apply it in different situations, such as continuous weak measurements and quantum control. I've been building a short library in *Mathematica* to deal with Monter Carlo Wave Functions and SMEs.
- The Critical Rabi Model (August 2018 - August 2019)
- We studied quantum and dissipative phase transitions in the Quantum Rabi Model
- **Graduate courses taken:** Quantum Mechanics I & II, Quantum Field Theory I, Machine Learning, Quantum Information and Quantum Noise, Stochastic Dynamics, Statistical Mechanics, Classical Mechanics **(8 in total)**

Federal Institute of São Paulo — São Paulo, Brazil
Highschool Researcher **Advidsor:** Dr. Marcio Yuji Matsumoto — 2015

- Development of a low-cost scanning tunnelling microscope
- We developed an interface written in C++ between an *Arduino* microcontroller to plot data and studied the technical details of the physics behind a STM
- Development of a home-bred video-game console using Arduino
- My electronics course thesis. I developed a home-bred video-game console (both the software and the hardware), which ran *Tetris* and *Pong*, from scratch using C++, OOP and a Arduino to control the TV output.
- Development of didactic materials for scientific Olympiads
- I wrote short lecture notes and solutions manuals for books commonly used in undergraduate courses in physics and preparatory books for Olympiads. Most of them can be found on my personal page.

Skills

- **Programming Languages:** C++, Python, Mathematica, Arduino
- **Tools:** LaTeX, Tikz, SciPy, OpenGL, Git, Jupyter
- **Other Skills:** SolidWorks and 3D printing, electronics, microcontrollers, Linux

Languages

- **English** ● ● ● ● ●
- **German** ● ● ● ○ ○
- **Japanese** ● ● ● ○ ○
  - **Japanese Language Proficiency Test N2** (2019)

Projects

Some shorter projects in which I participated, not necessarily related to my education:

• **Deck Creator** (2020):

An automatized script for e-books which automatically generates a deck of flashcards on Anki based on frequency list and the user's preexisting vocabulary (Available on GitHub)

• **Flight Simulation Gear** (2019 -):

Development of a flight cockpit in 3D-printed materials. The interface between the electronics and the software is built with Arduino and C++

• **Low-Cost Video Laryngoscope** (2020):

Development of a Video Laryngoscope using a Raspberry Pi and 3D printing together with a team of three people

• **Notes on Classical Mechanics** (2017):

A set of notes on Classical Mechanics based on *Landau and Lifshitz*. This and other notes are available on *https://alves-gabriel.github.io/notes.html* (in portuguese).

Scholarships and Awards

- Gold Medal - Brazilian Physics Olympiad for Public Schools 2014
- Gold Medal - Brazilian Physics Olympiad for Public Schools 2013
- Silver Medal - Brazilian Physics Olympiad 2015
- Silver Medal - Brazilian Physics Olympiad 2014
- Silver Medal - Brazilian Physics Olympiad 2013
- Gold Medal - Brazilian Astronomy Olympiad 2015
- Silver Medal - Brazilian Astronomy Olympiad 2014
- Silver Medal - Brazilian Astronomy Olympiad 2013
- Silver Medal - Math Kangaroo Olympiad 2014
- Silver Medal - Brazilian Robotics Olympiad 2015
- Bronze Medal - Brazilian Mathematics Olympiad for Public Schools 2015
- Honourable Mention - Brazilian Mathematics Olympiad for Public Schools 2014
- Honourable Mention - IYPT (Brazilian Edition) 2015

Courses, Schools and Workshops

- Paraty Quantum Information School — August 2019
  Poster Presentation - The Critical Rabi Model
- Brazilian Physics Society Autumn Meeting — May 2019
  Poster Presentation - The Critical Rabi Model
- Minicourse on Quantum Entanglement: From Quantum Information to Many-Body Physics and Beyond - ICTP-SAIFR/IFT-UNESP — August 2018