# JOAO BASSO

joao.basso@berkeley.edu ⋄ Google scholar ⋄ Personal website

## EDUCATION

**University of California, Berkeley, USA**                    *August 2022 - present*
*Ph.D. in Mathematics.*

**Tufts University, Medford, USA**                    *September 2016 - May 2020*
*Bachelor of Science, Summa Cum Laude, 3.91/4.0 GPA:* Mathematics, Physics and Computer Science triple-major.
*High Honors in Thesis:* "Coordinate-free Tensor Analysis".
*Activities:* Tufts Symphony Orchestra (concertmaster), Tufts Chamber Orchestra (associate concertmaster), Tufts Youth Philharmonic (mentor).

## PUBLICATIONS AND PRE-PRINTS

**L. Zhou, J. Basso, S. Mei (2024).**  Statistical Estimation in the Spiked Tensor Model via the Quantum Approximate Optimization Algorithm, *arXiv:2402.19456*.

**S. Sureshbabu, D. Herman, R. Shaydulin, J. Basso, S. Chakrabarti, Y. Sun, M. Pistoia (2023).**  Parameter Setting in Quantum Approximate Optimization of Weighted Problems, *Quantum*.

**D. Berry, Y. Su, C. Gyurik, R. King, J. Basso, A. Barba, A. Rajput, N. Wiebe, V. Dunjko, R. Babbush (2022).**  Analyzing Prospects for Quantum Advantage in Topological Data Analysis, *QIP 2022*, *PRX Quantum*.

**Google Quantum AI and Collaborators (2022).**  Suppressing quantum errors by scaling a surface code logical qubit, *Nature*.

**Google Quantum AI and Collaborators (2022).**  Formation of robust bound states of interacting photons, *Nature*.

**Google Quantum AI and Collaborators (2022).**  Noise-resilient Majorana Edge Modes on a Chain of Superconducting Qubits, *Science*.

**J. Basso, D. Gamarnik, S. Mei, L. Zhou (2022).**  Performance and limitations of the QAOA at constant levels on large sparse hypergraphs and spin glass models, *FOCS 2022*.

**J. Basso, E. Farhi, K. Marwaha, B. Villalonga, L. Zhou (2021).**  The Quantum Approximate Optimization Algorithm at High Depth for MaxCut on Large-Girth Regular Graphs and the Sherrington-Kirkpatrick Model, *TQC 2022, Outstanding paper award*.

**Google Quantum AI and Collaborators (2021).** Time-Crystalline Eigenstate Order on a Quantum Processor, *Nature*.

**Google Quantum AI and Collaborators (2021).** Information scrambling in quantum circuits, *Science*.

**Google Quantum AI and Collaborators (2021).**  Realizing topologically ordered states on a quantum processor, *Science*.

**J. Basso, L. Tu (2020).** Basis-free analysis of singular tuples and eigenpairs of tensors, *arXiv:2012.07313*.

**M. Mosca, J. Basso, S. Verschoor (2020).**  On speeding up factoring with quantum SAT solvers, *Nature Scientific Reports*.

**J. Basso, I. Yurchenko, M. Wiens, C. Staii (2019).** Neuron dynamics on directional surfaces, *Soft Matter*.

**I. Yurchenko, J. Basso, V. Syrotenko, C. Staii (2019).** Anomalous diffusion for neuronal growth on surfaces with controlled geometries, *PLoS One.*

**J. Basso, I. Yurchenko, M. Simon, D. Rizzo, C. Staii (2019).** Role of geometrical cues in neuronal growth, *Physical Review E.*

**J. Basso, M. Simon, C. Staii (2018).** Neuronal dynamics on patterned substrates measured by fluorescence microscopy, *MRS Communications.*

## WORK EXPERIENCE

**JPMorganChase, New York, NY, USA** *June 2024 - August 2024*
*Summer Associate*
- Quantum computing research under the Global Technologies Applied Research.

**NASA Quantum AI Lab, Mountain View, CA, USA** *August 2023 - May 2024*
*Research Assistant*
- Work on quantum algorithms through the Universities Space Research Association (USRA).

**Amazon Web Services (AWS), Pasadena, CA, USA** *May 2023 - August 2023*
*Research Scientist Intern*
- Worked on the development and analysis of quantum algorithms at the AWS Center for Quantum Computing.

**Google Research - Quantum AI, Venice, CA, USA** *August 2020 - August 2022*
*AI Resident*
- Worked on the development and analysis of quantum algorithms.

**Institute for Quantum Computing, Waterloo, ON, Canada** *Summer 2020*
*Research Assistant*
- Worked with Prof. Michele Mosca on the quantum derandomization of algorithms and circuit synthesis.

**Institute for Quantum Computing, Waterloo, ON, Canada** *Summer 2019*
*Research Assistant*
- Worked with Prof. Michele Mosca on three projects: speeding up factoring with quantum SAT solvers, algorithms for lattices in the $\ell_p$ norm and algorithms for T-gate count.

**Boston University, Boston, MA, USA** *Summer 2018*
*Research Assistant*
- Worked on the 0,1-PERMANENT to #SAT reduction, tensor networks and relational algebra methods for solving SAT and other topics related to quantum computing, along with Prof. Claudio Chamon and Dr. Stefanos Kourtis.

**Staii Research Group, Tufts University, Medford, MA, USA** *2017 - 2020*
*Research Assistant*
- I worked with Prof. Staii investigating geometrical and topological properties of neuronal growth on controlled substrates.

**Tufts University, Medford, MA, USA** *2017 - 2020*
*Teaching Assistant*
- I have been a TA for: **Complex Variables** (Spring '19), **Algorithms** (Summer '18), **Linear Algebra** (Fall '19), **Discrete Mathematics** (Fall '17, Spring '18, Fall '18), **Intro to Physics 1** (Fall '17, Fall '18), **Intro to Physics 2** (Spring '18, Spring '19), **General Physics 11** (Fall '17, Fall '19), **General Physics 12** (Fall '17, Spring '20), **Portuguese** (Spring '17, Fall '17, Spring '18).
- Tasks involved teaching recitations, holding office hours, grading and proctoring.

**Tufts CEEO, Medford, MA, USA** *Winters 2017 & 2018*
*Engineering Intern*

· Development of a web-based IDE for programming the LEGO Mindstorms EV3 with Python. The IDE was later used by a professor for robotics classes at Tufts.

**Escola Yadaa, Sao Carlos, SP, Brazil** *January 2016 - August 2016*
*Robotics and Programming Teacher*

· Taught students 7+ and coached the teams that competed in the Brazilian Robotics Olympiad.

## HONORS AND AWARDS

**Jane Street Graduate Research Fellowship Award**: Honorable mention. (2024)

**Outstanding Paper Prize**: 17th Conference on the Theory of Quantum Computation, Communication and Cryptography. (TQC 2022)

**2020 Senior Award:** Awarded to six to 12 graduating members of the senior class for academic achievement, participation in campus and community activities, and leadership. (Tufts University Alumni Association, April 2020).

**Benjamin G. Brown Scholarship:** Awarded to Tufts seniors who have shown promise in scientific research. (Tufts University, April 2020)

**Tufts Career Center Internship Grant**: Received for a summer research internship at Boston University. (Summer 2018)

**Howard Sample Prize Scholarship in Physics**: Awarded for outstanding performance in General Physics I and II, calculus-based. (Tufts University, March 2018)

**Portuguese Conversation Group Leader**: Award of Excellence. (Tufts University, May 2017)

**Brazilian Physics Olympiad**: 1 Silver ('13), 1 Bronze ('12) and 1 Honorable Mention ('14) medals.

**Physics Olympiad of Sao Paulo**: 2 Bronze ('14, '10) medals.

**Brazilian Astronomy and Astronautics Olympiad**: 5 Gold ('08, '10, '12, '14, '15) and 3 Silver ('09, '11, '13) medals.

**FIRST LEGO League**: 1 Robot Design ('10) and 2 Core Values ('11, '13) trophies.

## TALKS

"Performance and limitations of the QAOA at constant levels on different problems", American Physical Society March Meeting 2023, Las Vegas, NV, USA.

"Recent advances on the union-closed sets conjecture", Discrete Analysis Seminar, UC Berkeley, February 2023.

"Towards a quantum algorithm for the Unique Sink Orientation problem", Discrete Analysis Seminar, UC Berkeley, October 2022.

"Analytical guarantees and limitations of QAOA's performance", Quantum many-body seminar, UC Berkeley, September 2022.

"The QAOA at High Depth for MaxCut on Large-Girth Regular Graphs and the Sherrington-Kirkpatrick Model", American Physical Society March Meeting 2022, Chicago, IL, USA.

"Neuronal dynamics on patterned substrates measured by fluorescence microscopy", American Physical Society March Meeting 2019, Boston, MA, USA.

## SERVICE

Paper refereeing: PRL; PRA; PRX Quantum; SODA 2023; TQC 2022; Nature Scientific Data; IEEE Transactions on Quantum Engineering; Quantum Journal; Quantum Science and Technology.

Session chair for "Understanding and Mitigating Decoherence in Superconducting Qubits" at APS March Meeting, 2023.

## LANGUAGES

English (fluent); German (intermediate); Portuguese (native).