Ivan Tadeu Ferreira Antunes Filho

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B.S. Computer Science and Electrical Engineering & Mathematics, MIT, 2017
Master of Engineering in Computer Science, MIT, 2019

Experience

Present - July 2022 **Senior Software Engineer**, Google, Cambridge, MA.
I added support for Thin Link Time Optimizations to Google Android apps, decreasing app sizes in 5 to 7%, resulting in over $50M in annual savings, and improved performance of apps by approx. 5%, receiving a performance award for the project. Added a toolchain for compiling **Rust** for Apple, MacOS, Windows and streaming devices. Automated the update process of Rust Toolchains to decrease maintenance time. Maintains the Apple C++ Cross Compiler, and the Rust Cross Compiler. Working at the Portable Toolchains team at Google Cambridge, a team responsible for improving the toolchains used for compiling C++ and Rust to Mobile, Mac and Windows.

July 2022 - Sep 2019 **Head of Algorithms**, Radix Labs, Cambridge, MA.
Hired as one of the first 5 employees, wrote the data structures used to represent labware internally, in **Scala**; developed a resource constrained project scheduling tool to better schedule lab tasks with support for take-give resources, mutually exclusive sets of tasks, minimum and maximum wait constraints and resources categories that could schedule around 1000 tasks in 1 second; wrote a **JS** + **Html** + **Css** UI for the scheduler; had client meetings to discuss project requirements; interviewed co-op and full time candidates and took part in virtual career fairs; helped with onboarding of new employees; managed the interns of the algorithms team; improved performance in code that used Z3 Sat Solver; overall backend work.

2019 **Master of Engineering Thesis**, CSAIL - MIT, Cambridge, MA.
Being advised by Erik Demaine, wrote a thesis in Characterizing Boolean Satisfiability Problem Variants. It surveyed multiple SAT problems, and attempted to standardize the notation. In the thesis it was also proven the time complexity of some new SAT variants. `erikdemaine.org/theses/ifilho.pdf`.

January 2019 **Student Instructor**, *6.s092 Introduction to Algorithms in 12 hours* - MIT, Cambridge, MA.
Organized an 1 month long class at MIT as one of the lead instructor responsible for defining the curriculum. The class had over 100 students registered. It received a 6.4/7 evaluation in 2019, being the 5th highest rated January CS class, and the highest rated with more than 15 students.

Spring 2019 **Teaching Assistant**, *6.042 Mathematics for Computer Science* - MIT, Cambridge, MA.
Taught recitations and was responsible for distributing work to the student graders.

Summer 2018 **Research Assistant**, CSAIL - MIT, Cambridge, MA.
Making the memory management of Tock safer, by stopping unsafe **Rust** functions from having unintended effects. Found CVE-2018-1000660

Fall 2018 Spring 2018 Fall 2017 **Teaching Assistant**, *6.006 Introduction to Algorithms* - MIT, Cambridge, MA.
Really enjoyed teaching recitations and helping the students during office hours, as well as making them excited about algorithms. Received a 6.5/7 evaluation in Fall 2017, 6.7/7 in Spring 2018.

Summer 2017 **Performance Researcher**, Quantlab, Boston, MA.
Helped design and improve a Domain Specific Language used by Quantlab's trading system.

Summer 2016 **Software Engineering Intern – Neko Team**, Facebook, Seattle, Wa.
Improved organic post logging in mobile using **HackLang** and **PHP** and created pipelines and an API endpoint to analyze publishers Return On Ad Spend using **Hive**, **Presto** and **Mysql**.

Summer 2015 **Software Engineering Intern – Search Quality Team**, Indeed, Austin, TX.
Developed visualization tools for user data using **Javascript** and **HTML 5**. Created a webapp to help identify user metadata in Indeed's Visualization tools. Created a small library in **Java** for converting logged data in Hadoop. Changed the data storage format used for ads personalization. Added filters to Indeed's AB testing interface

Summer 2014 **Software Engineering Intern – Search Quality Team**, Indeed, Austin, TX.
Made the generation of snippets on the main company website 80% faster, recognizing non-obvious bottlenecks with the use of profilers. Rewrote performance critical job indexing code using **Intel Intrinsics**, **C** and **C++**

Fall 2013 **Undergraduate Researcher**, Camera Culture, Media Lab, MIT, Cambridge, MA.
Frequency Based Spatial Encoding for Single Sensor Sonar and Medical Ultrasound. Available on *tinyurl.com/see-corners*

Awards

2009-2013 **Science Olympiads**, Self taught Physics, Astronomy, Chemistry, Linguistics, Biology, Math, Algorithms and C++ with 29 national awards and 11 international awards. Full list available at `https://tinyurl.com/ivanta`.

- International Physics Olympiad — Gold Medal (2012, Estonia)
- International Astronomy and Astrophysics Olympiad — Silver Medal(2012, Brazil)
- International Linguistics Olympiad — Silver Medal (2012, Slovenia)
- Iberoamerican Biology Olympiad — Silver Medal (2012, Portugal)
- International Junior Science Olympiad — Gold Medal (2010, Nigeria)
- Brazilian Informatics Olympiad — Gold Medal (2010, Brazil), Silver Medal (2011, Brazil)

Jan 2015 **MASLAB - Cocoabot**, *1st place team at the MIT Autonomous robots competition*.
We built Cocoabot, a robot that finds and stacks cubes by color. Cocoabot had around **10.000 lines of C++11** code, split in 10 threads in an Intel Edison. I was responsible for integrating the modules, designing the state machine and the motor-controllers code, debugging the code with **GDB** and finding memory leaks. Documented on *tinyurl.com/cocoabot*.

2018 **Makemit AugModules**, *Winner of "Verizon - Best IoT Project"*.
We created an AR interface to connect IOT devices, to show that AR could be used to manage the dataflow between IOT devices. More info on *devpost.com/software/augmodules*.

Projects

Fall 2018 **Static website generator; webcam scanner; export org with external files**, *Org mode projects*.
Using **Elisp** and org mode, made a static website generator. With **Elisp**, **Bash** and **Python** a script to scan pages.

Summer 2016 **Static typed website**, *For parent's business in Brazil*.
Created a single page static website using Hugo (**Go**), **HTML**, **CSS**, **Js**. Available on `github.com/itf/lazuli`

Jan 2016 **Iron Curtain 2**, *30x60 LED Panel*.
Organized the construction of a 30x60 pixels (2m by 1m) LED Panel in 4E, MIT, and wrote functional programming code in **Python** to control and combine the patterns displayed by the panel, on *github.com/itf/iron-curtain-2*

2015-2016 **4E Hall projects**, *Bemix(centralized music system); Hall Wiki, Printers and Servers. Project Fund*.
Added Youtube streaming on Bemix. Maintained the 4e wiki and printers ande servers. Organized hall's "project fund".

2010-2014 **OlimpiadasCientificas**.
First Brazilian website to help high school students and teachers to participate in Science Olympiads. ∼500 visits per day, made with wordpress.org. It was cited by the largest Brazilian newspaper in 2012, `tinyurl.com/ocientif`.

Publications

2020 Edge Matching with Inequalities, Triangles, Unknown Shape, and Two Players. Available on *https://www.jstage.jst.go.jp/article/ipsjjip/28/0/28_987/_article*

2014 Frequency Based Spatial Encoding for Single Sensor Sonar and Medical Ultrasound. Available on *tinyurl.com/see-corners*

Academics and Various

Courses 4.5 B.S. GPA 4.75 M.Eng GPA
○ Comp. Systems Security ○ Comp. and Network Security ○ OS Eng. ○ Comp. Networks ○ Machine Learning ○ Design and Analysis of Algorithms ○ Advanced Algorithms ○ Algorithmic Lower Bounds ○ Power Electronics Lab ○ Robotics: Science and Systems 1 ○ Theory of Computation ○ Algebra I-II ○ Principles of Discrete Applied Math ○ Real Analysis ○ Signals, Systems, and Inference ○ Discrete-Time Signal Processing ○ Information Aquisition and Proces.

Languages ○ Portuguese ○ English