Francisco Leal Machado

Curriculum Vitae

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Education

2013–2016 **Massachusetts Institute of Technology**,
Candidate for Bachelor of Science Degree in Physics,
Cambridge, MA,
GPA – 5.0/5.0.

2012–2013 **Universidade de Coimbra**,
Candidate for Licence in Physics,
Coimbra, Portugal,
GPA – 5.0/5.0.

Experience - Research

2015–Present **Undergraduate Research**, MIT Solid State Solar Thermal Energy Conversion (S^3TEC), Cambridge, Massachusetts.

Research in surface plasmon induced enhancement in electronic transitions

- Developing the code that will calculate the rates of the electronic transitions with different electromagnetic backgrounds.
- Designing different plasmon plasmon modes in order to selectively enhance particular transitions for an atom near the surface of our material.

2015 **Undergraduate Research**, MIT Center for Material Science and Engineering, Cambridge, Massachusetts.

Research in transport properties of electrons in low-dimensional materials.

- Fabricated devices which included selecting proper material flakes, charecterizating their properties and assembling in final device to be used in measurements.
- Developed new device configurations to allow the better measurement of transport properties.

2014 **Undergraduate Research**, MIT Kavli Institute for Astrophysics and Space Research, Cambridge, Massachusetts.

Research in spectral data from galaxies from a simulation of the galaxy

- Analyzed how to make use of the simulated galaxies informations to better understand the properties of observable galaxies.
- Developed tools that allow the matching between simulated and observed galaxies.

2014 **Undergraduate Research**, MIT Aerospace Computational Design Lab, Cambridge, Massachusetts.

Research in optimization of a numerical simulation of a stationary fluid flow

- Analyzed and discovered the source of the major slow down in the program's run time.

2012–2013 **Undergraduate Research**, Universidade de Coimbra - Physics Department, Coimbra, Portugal.

Research in the topic of the dynamics of proteins and their protein reporter using computer simulations and stochastic models.

- Developed the simulation code used to run the simulations in the project.
- Compiled and analyzed the data, presenting it at at a conferences
- Presented results in poster format at the International Conference on Stem Cells for Drug Screening and Regenerative Medicine (2013)

Experience - Work

2014 **Summer Intern**, MemSql, San Francisco, US.
- Worked directly on their C++ codebase
- Developed and implemented features that were shipped to customers promptly.

2013 **Senior Developer**, JeKnowledge, Coimbra, Portugal.

2012–2013 **Junior Developer**, JeKnowledge, Coimbra, Portugal.

Active Member of the Technology Department.
- Helped on the development of a human body detection software to analyze the correct movement of the body in various exercises.
- Developed a glove prototype of a new product using Arduino technology.
- Helped in the development of the data aquisition software for a new product in a start-up.

Awards

2015 Winner of the Edward C. Pickering Award for the most Outstanding Original Project in the MIT Physics Junior Lab

2013 3% Best Studen Award at the University of Coimbra

2013 Bronze Medal at the ACM SouthWestern Regional Contest

2012 Bronze Medal at the International Physics Olympiads

2012 Bronze Medal at the International Olympiads of Informatics

2012 Gold Medal at the Portuguese University Programming Marathon

2012 Third Place in the Portuguese Olympiads of Informatics

2011 Honorable Mention at the IberoAmerican Mathematics Olympiads

2011, 2012 Silver Medal at the Portuguese Mathematics Olympiads

Publications

Paul Torrey, Sarah Wellons, *Francisco Machado*, Brendan Griffen, Dylan Nelson, Vicente Rodriguez-Gomez, Ryan McKinnon, Annalisa Pillepich, Chung-Pei Ma, Mark Vogelsberger, Volker Springel, and Lars Hernquist. An analysis of the evolving comoving number density of galaxies in hydrodynamical simulations. *Monthly Notices of the Royal Astronomical Society*, 454(3):2770–2786, 2015.

Conferences

2013 **International Conference on Stem Cells for Drug Screening and Regenerative Medicine**.
- Presented poster "Following the Stochastic Dynamics of Nanog Through a Fluorescent Reporter - A Computational Study" on work on DNA dynamics

Summer Schools

2015 Novos Talentos Em Matemática Dynamical Systems Summer School

Languages

Portuguese	Mothertongue
English	Fluent
Spanish	Basic
French	Basic
German	Basic