

# STEFANO CASTRO TOGNINI

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I have a **Ph.D. in Physics**, focused in High Energy Physics. Currently a **Research Associate at Oak Ridge National Laboratory** working on Monte Carlo development for the DOE Exascale Computing Project. In the past I was a **collaborator at Fermi National Accelerator Laboratory (Fermilab)**, working as a Master's, and later on Ph.D. candidate, in two experiments known as MINOS and NO $\nu$ A. These are long-term multi-million dollar endeavors built to understand the nature of neutrinos and answer fundamental questions related to astrophysics, dark matter, and more. Each experiment is a worldwide effort encompassing up to 300 scientists. My **7+ years of experience** working with diversified teams produced many **published data analyses**, all developed using **C++, Python, ROOT, shell scripting, massive parallel computing, and Monte Carlo simulations**. Software development is managed using **version control (GIT/SVN)**, allied with automated code referencing (**Doxygen**). Production of **technical documentation** is routinely done. Finally, I have experience with **teaching** at the undergraduate level, **mentoring** graduate students, presenting findings at international conferences, as well as participating in **science outreach** events.

## PROFESSIONAL EXPERIENCE

### Research Associate

**Oak Ridge National Laboratory**  
Nuclear Energy and Fuel Cycle Division

📅 2019 – Present

📍 Oak Ridge (TN)

## COLLABORATIONS & EXPERIMENTS

### Celeritas Project

[github.com/celeritas-project](https://github.com/celeritas-project)

📅 2020 – Present

📍 U.S. (Oak Ridge)

1. Core member of the Celeritas development team.
2. Implemented electromagnetic physics processes.
3. Implemented data import tool to load Geant4 data into Celeritas.
4. Developed validations tools to compare physics correctness and code performance against Geant4.
5. Developed an event display to visualize detector geometry and particle information.

### URL Muon Detector Project

📅 2020 – Present

📍 U.S. (Oak Ridge)

1. ore team member involved with all stages of the project: Detector design, simulation, commissioning, deployment, and analysis.

### NO $\nu$ A Experiment

[novaexperiment.fnal.gov](http://novaexperiment.fnal.gov)

📅 2013 – 2018

📍 U.S. (Fermilab/Argonne) / Brazil (UFG)

1. Leading author of a published data analysis: [PRD 99 122004](#)
2. Integrated a Monte Carlo package with the Fermilab computing framework that is being used by two other experiments at Fermilab and CERN.
3. Commissioned/maintained a Remote Operation Center (ROC) at UFG.
4. Hardware work that consisted in testing the quality of Avalanche Photo Diodes before being installed in the NO $\nu$ A detector.

### MINOS Experiment

[www.numi.fnal.gov](http://www.numi.fnal.gov)

📅 2011 – 2018

📍 U.S. (Fermilab/Argonne) / Brazil (UFG)

1. Worked in 2 published data analyses: [PRD 91 112006](#) / [PRD 93 052017](#).
2. Wrote documentation for commissioning and certifying ROCs.
3. Installed and maintained the MINOS Main Operation Center at Fermilab.
4. Built, documented, and maintained a MINOS ROC at UFG.

## SCIENTIFIC PUBLICATIONS

INSPIRE HEP profile | [inspirehep.net/authors/1074966](https://inspirehep.net/authors/1074966)

## SOFT SKILLS

Teaching (3 yrs)

Mentoring (4 yrs)

Scientific outreach

Public speaking

Portuguese (native)

English

Italian

French



## HARD SKILLS

### Technical skills

Data structuring

Parallel computing

Data querying

Data analysis

Monte Carlo simulation

Data visualization

### Programming & scripting languages

C/C++

Python

SQL

Shell

L<sup>A</sup>T<sub>E</sub>X

### Frameworks, libraries, databases, & tools

Fermilab ART Framework

ROOT

Geant4

CORSIKA

Redmine

Doxygen

GIT

PBS TORQUE

## EDUCATION

Ph.D. in Physics – High Energy Physics

**Federal University of Goias, Brazil**

Funding: CAPES, CNPq, Argonne

📅 2012 – 2018

DOE OSTI [www.osti.gov/biblio/1468447](https://www.osti.gov/biblio/1468447)  
INSPIRE HEP [inspirehep.net/record/1692030](https://inspirehep.net/record/1692030)

M.Sc. in Physics – High Energy Physics

**Federal University of Goias, Brazil**

Funding: CAPES, Fermilab

📅 2010 – 2012

B.Sc. in Physics

**Federal University of Goias, Brazil**

📅 2005 – 2010