

# GABRIELE BOZZOLA, PHD *Software Engineer at CliMA, California Institute of Technology*

🌐 [sbozzolo.github.io](https://sbozzolo.github.io)

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## IN A NUTSHELL

- Python (6 yrs) and Julia (1 yr) programmer, author of the analysis+visualization library for [Einstein Toolkit](#) and CliMA.
- [Recognized computational physicist](#) with expertise in [high-performance](#) and [scientific computing](#).
- Innovative [researcher](#), with 12+ publications, 100+ citations, \$ 200k+ in grants, 3 awards for exceptional research.
- Specialized in [large-scale simulations](#), with 10M+ CPU-hours awarded on national supercomputers.
- Instructor, mentor, and [communicator](#), with 30+ invited/contributed talks, 1 award for excellence in teaching.
- Active member of the open-source world, co-maintainer of [vterm](#)—the fastest terminal emulator for Emacs.

## SKILLS

MY DAY-TO-DAY: Julia, Python (NumPy, matplotlib, SciPy, tests, documentation, packaging), Emacs, git, Bash, Linux, simulations, High-Performance Computing, CUDA, CI, benchmarking, differential equations, differential geometry.

EXPERIENCE WITH: C, C++03, Fortran90, awk, regexp, OpenMP, High-Throughput Computing, HTCondor, PBS, MPI.

## EDUCATION

2018–2023 University of Arizona — MSc and PhD in Astrophysics (GPA: 4/4, PhD defense: April 2023)

2012–2017 University of Milan — BSc and MSc in Physics (*summa cum laude*, GPA: 30/30)

## RELEVANT EXPERIENCE

- Reduced time to implement new analyses and train new Einstein Toolkit users by > 90% by designing and developing a new Python library for [post-processing and visualization](#) ([kuibit](#), >30k lines of code).
- Advanced theoretical models of black holes by [designing and performing massively-parallel simulations](#) (~1000 cores) with novel numerical methods for differential equations and data analysis. Disseminated results through 12+ peer-reviewed publications (one selected as [journal cover](#)) and 30+ contributed/invited talks.
- Enabled new scientific capabilities and found new results by building modules for initial data, data processing, diagnostics, and infrastructure for the [Einstein Toolkit](#), the most popular public code for relativistic astrophysics. Worked on a [large legacy code base](#) (> 500k lines of C/Fortran code) and in a [distributed and multidisciplinary community](#). Took part in planning, documenting, testing, and releasing new versions.
- Performed scaling tests comparing infiniband with RoCE and determined impact on large MPI simulations as part of the [benchmarking](#) team that advised UArizona on the purchase of its latest (\$ 2M) supercomputer.
- Discovered new neutron star properties by efficiently analyzing ~100k models with high-throughput computing.
- Tested and [optimized](#) Einstein Toolkit on a non-x86 architecture, leading to improved support for IBM POWER9.
- Expanded capabilities of a GPU code for general-relativistic ray tracing by implementing new physics modules.
- Characterized properties of a [new design](#) for radiation-hardened integrated circuits by running simulations with Cadence Virtuoso&Spectre (for my BSc thesis, within the [CHIPIX65 collaboration](#)).
- Developed and maintained [open-source packages](#) for science and [Emacs](#).

## WORK EXPERIENCE

- **Software Engineer** at the California Institute of Technology (CA). Aug 2023 –
- **Research and Teaching Assistant** at University of Arizona in Tucson (AZ). Jan 2018 – Aug 2023
- Taught classes, mentored 5 students, and received 3 awards for excellence in teaching and research.
- Reviewed publications for international academic journals (including the [Journal of Open Source Software](#)).
- Co-founded and ran for two years the [Steward Observatory International Scholars Task Force](#) that assisted >20 international scholars in their transition to UArizona by providing mentorship and additional resources.

## SELECTED GRANTS AND AWARDS

2024 [Metropolis award](#) for outstanding dissertation work in computation physics by the American Physical Society

2021 Selected as one of 21 NASA Future Investigator in Space Science (\$ 135k + 146k node-hours valued \$ 69k)

2020 Selected as one of 5 Texas Advanced Center for Computing Frontera Fellows (\$ 44k + 50k node-hours)

LANGUAGES AND NATIONALITY: Italian (mother tongue), English (full proficiency); Italian nationality.