

STEFAN TRKLJA COUNTRYMAN

Physics Ph.D. Candidate at Columbia University working in
Gravitational Wave (GW) Multi-messenger Astrophysics (MMA)

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🐙 github.com/stefco



EXPERIENCE

Physics Ph.D. Student/Graduate Research Assistant

Columbia University

📅 September 2014 – Present

📍 New York, NY

- Designed & coded **LLAMA**, first online search for neutrinos from GW sources
 - Best-in-class custom pipeline library for fetching and statistically analyzing heterogeneous observational data streams in low-latency
 - Fastest GW/ ν MMA search pipeline since introduction in 2016
 - Added Bayesian statistical method upgrade for 2019/LIGO O3
- Wrote **hpmoc**, world's first high-performance multi-resolution HEALPix vector math library for incorporation of spatial priors in MMA searches
 - Algorithm gives $10^5 \times$ speedup over competing image processing libraries
 - Most advanced skymap plotting/algo prototyping tools in field
- The most feature-rich, extensible, performant, reliable, reproducible, and mature GW MMA software library to-date
- Maintained LIGO's timing system, developed and installed systems and tools for its independent diagnostic system, and documented all of it
- Applied detector and software expertise to other group science goals
- 1,000s of hours of teaching, tutoring, & outreach in math & physics

Science and Programming Outreach Consultant

World Science Festival

📅 April 2015 – May 2016

📍 New York, NY

- Advised Chairman Prof. Brian Greene on outreach/education tech
- Transitioned World Science U to superior, open-source technology stack
- Designed & coded in-browser physics simulations ([kinematica.github.io](https://github.com/kinematica))

Founder

West End Coaching and skilld.co

📅 Mid 2013 – Late 2014

📍 New York, NY

- Founded/operated highly-profitable tutoring company *West End Coaching*
- Founded on-demand marketplace skilld.co and tested MVP app

SELECTED PUBLICATIONS

Journal Articles

- Countryman, S. et al. (Jan. 2019). "Low-Latency Algorithm for Multi-messenger Astrophysics (LLAMA) with Gravitational-Wave and High-Energy Neutrino Candidates". In: *arXiv e-prints*. arXiv: 1901.05486 [astro-ph.HE].
- Bartos, I. et al. (Oct. 2018). "Bayesian Multi-Messenger Search Method for Common Sources of Gravitational Waves and High-Energy Neutrinos". In: *arXiv e-prints*. arXiv: 1810.11467 [astro-ph.HE].

HONORS & AWARDS



Special Breakthrough Prize in Fundamental Physics

For contributions to LIGO's Nobel-prize-winning first detection of gravitational waves, GW150914



Gruber Cosmology Prize

Also for GW150914

TECHNICAL SKILLS

Scientific Computing	Python	Rust
Technical Writing	UNIX	Bash
APL	Docker	Haskell
SQL	Statistics	Git
MATLAB	Julia	C
DevOps	JavaScript	FPGA
Electronics	Web	

LANGUAGES

English
Bosnian/Serbian/Croatian
French
Italian



EDUCATION

Ph.D. in Physics (*in-progress*)

Columbia University

📅 September 2014 – Present

Thesis title: Novel Computational Methods for Image Processing and Compression with Application to Multi-Messenger Astrophysics using Gravitational Waves and High Energy Neutrinos

M.Sc. and M.Phil. in Physics

Columbia University

📅 September 2014 – May 2017

B.Sc. in Applied Mathematics

Columbia University

📅 September 2009 – October 2013

with English minor