Samuele Ronchini

Curriculum Vitae

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Research Activity and Expertise

My research lies at the intersection of high-energy astrophysics, multi-messenger astronomy, and gravitational wave (GW) science. I specialize in gamma-ray and X-ray data analysis of gamma-ray bursts (GRBs), including their theoretical interpretation, population studies, and connections to compact binary mergers. I actively contribute as an analyst to the real-time, low-latency Swift-BAT subthreshold search, focusing on targeted follow-up of external transients such as GWs. Additionally, I am involved in shaping the science case for next-generation GW detectors, with particular emphasis on their synergy with upcoming high-energy observatories, both space- and ground-based.

Professional Experience

- Aug 2025 – present: Postdoctoral scholar at the Gran Sasso Science Institute
- Jan 2023 – July 2025: Postdoctoral scholar at the Swift Mission Operation Center, PennState University, Pennsylvania, United States. Member of the Institute of Gravitation and the Cosmos, PennState University
- 2024 – present: Coordinator of the LVK–Swift–Fermi liaison

Education

- **PhD in Astroparticle Physics**
  Gran Sasso Science Institute [01/11/2018 – 27/04/2023]
  Final grade: Cum laude
  Thesis: *Probing the physics of GRBs through high-energy and multi-messenger observations.*
  Supervisor: Prof. Marica Branchesi, Dr. Gor Oganesyan.
- **Master Degree in Physics – Curriculum Astrophysics**
  University of Rome Tor Vergata [10/2016 – 10/2018]
  Final grade: 110/110 cum laude
  Thesis: *X-ray analysis of the accreting supermassive black hole in the radio galaxy PKS 2251+11.*
  Supervisor: Prof. Francesco Tombesi.
- **Bachelor Degree in Physics**
  University of Rome Tor Vergata [10/2013 – 09/2016]
  Final grade: 110/110 cum laude
  Thesis: *The Galactic Center and his activity in a recent past.*
  Supervisor: Prof. Fausto Vagnetti.

Network and Memberships

- Member of the Swift team. I work on the development and monitoring of the real-time low-latency Swift-BAT sub-threshold analysis pipeline. I contribute as well to the observational strategy of Swift during the LVK observing run O4.
- Member of the LIGO, Virgo and KAGRA collaboration. Currently coordinator of the LVK–Fermi–Swift liaison, for joint GW–EM searches. I have been working since 2019 in the Multi-messenger Transients group, as analyst

of GW searches targeted on GRBs, using both PyGRB and Xpipeline.

- Member of the Einstein Telescope (ET) collaboration, Division 4: Multi-messenger Observations. I work on the prediction of joint GW+EM detections and the optimal observational strategy for ET.
- Member of the research team of the PRIN 2020KB33TP: "Multimessenger astronomy in the Einstein Telescope Era (METE)" funded by MUR with 796 k€.
- I took part in the definition of the multi-messenger science case of the Lunar Gravitational Wave Antenna (LGWA). My role is to understand the entity of the electromagnetic emission preceding and during the merger, as well as to establish the most promising astronomical facilities which could cooperate with LGWA.
- Member of the ENGRAVE and GRAWITA collaborations, as part of the theory group, for the modeling of astrophysical transients associated with GW signals.
- Member of the consortium for the development of the mission concept THESEUS. I worked within the Population and GRB science and multi-messenger working groups. My role is to establish 1) the potentialities of the synergy between THESEUS and future GW observatories for the joint detection of compact binary mergers 2) the capabilities of THESEUS for the investigation of the X-ray emission of GRBs, including the steep decay phase and the plateau phase.
- I have been contributing to the definition of the multi-messenger science case of future NASA and ESA -ray/X-ray missions, such as MoonCat, Crystal Eye, GRINTA, newASTROGAM and STROBE-X.

Conferences and Seminars

- X-ray conference, September 2019, poster
- THESEUS Scientific Working Groups Meeting, April 1–2 2020
- THESEUS Consortium meeting, June 3–4 2020
- Annual Conference of the European Astronomical Society, June 29–July 3 2020
- Online Summit on Astrophysics and Space Research (CASR 2020), 12–13/11/2020, invited talk
- 9th Fermi Symposium, 12–17/04/2021, poster
- EuCapt Symposium, 05–07/05/2021, contributed talk
- European Astronomical Society 2021, 28/06–02/07/2021, poster
- Amaldi Conference, 19–23/07/2021, poster
- National Astronomical Society meeting, 19–23/07/2021, poster
- EPS–HEP, 26–30/07/2021, contributed talk
- TAUP, 30/08–03/09/2021, contributed talk
- SIF conference, 13–17/09/2021, contributed talk
- INTEGRAL Workshop, 11–15/08/2021, contributed talk
- Astroparticle Symposium, University of Saclay, 13–27/11/2021, two contributed talks
- IAU Symposium: "Neutron Star Astrophysics at the Crossroads: Magnetars and the Multimessenger Revolution", 03/12/2021, contributed talk
- GWPAW, 14–17/12/2021, poster
- Les rencontres des physique de la Vallé d'Aoste, 06–12/03/2022
- AHEAD workshop, L'Aquila, 04/05/2022, contributed talk

- PHAROS conference, Rome, 16–19/05/2022, poster
- ENGRAVE webinar, 13/06/2022, contributed talk
- EAS conference, Valencia, Spain, 26/06–01/07/2022, contributed talk
- National Astronomical Meeting, online, 11–15/07/2022, contributed talk
- COSPAR conference, Athens, 16–24/07/2022, contributed talk
- TDAMM workshop, Annapolis (US), 22–24/08/2022, contributed talk
- Gravi-Gamma workshop, Volterra (Italy), 5–7/10/2022, invited talk
- XIII Einstein Telescope Symposium, Cagliari (Italy), 8–12/05/2023, invited talk
- GRB50, Warrenton (VA), 28–31/08/2023, poster
- 1st Astrophysics in the New Era of MM Astronomy International Conference, Poços de Caldas, Brazil, 4–8/12/2023, invited talk
- EAS conference, Padua, Italy, July 2024, contributed talk + poster
- COSPAR conference, Busan, South Korea, July 2024, two contributed talks
- 11th Fermi Symposium, Maryland, Sept. 2024, invited talk
- Swift workshop for the NASA senior review, Oct. 2024, invited review talk
- Workshop on GRBs and central engine powered transients, Playa del Carmen, Mexico, Dec 2024, invited talk
- AAS winter meeting, National Harbor, Jan 2025, contributed talk
- Swift20 Conference, Florence, March 2025, contributed talk
- PAX and CE conference, University of Urbana-Champaign, IL, invited talk and panelist of the multi-messenger session

Talks and Webinars in Collaboration Meetings

- ENGRAVE webinar, 29/04/2021
- Teongrav webinar, 20/01/2022
- Einstein Telescope Observational Science Board Division 4, 17/06/2022, invited talk
- ENGRAVE webinar, 31/10/2021
- ENGRAVE webinar, 31/10/2024

Grants and Observational Proposals

- PI of the HET proposal for the 3rd trimester of 2023, for the allocation of 6.6 hr to follow up a kilonova event during the fourth LVK observing run.
- Co-I of the Swift-GI key project, cycle 20: "The detection and monitoring of electromagnetic counterparts of gravitational waves sources with Swift in O4", PI Jamie Kennea, 100 k$.
- Co-I of the Swift-GI key project, cycle 21: "The detection and monitoring of electromagnetic counterparts of gravitational waves sources with Swift in O4", PI Jamie Kennea, 100 k$.
- Co-I of the Swift GI, cycle 21: "Increasing the rate of well-localized transients with BAT-GUANO", PI James DeLaunay, 40 k$.
- Co-I of the Fermi GI, cycle 17: "A joint Swift/BAT and Fermi/GBM search", PI James DeLaunay, 75 k$.

- Co-I of the 2024 ADAP: "By Their Powers Combined: Swift-BAT and Fermi-GBM Unveil Thousands of New GRBs", PI James DeLaunay, 522,523 $.
- Co-I of the Fermi GI, cycle 18: "Enriching Fermi/GBM GRBs with GUANO and NITRATES: A fertile approach to improve localizations", PI Jamie Kennea, 75 k$.

Honors and Awards

- Winner of the "Bruno Rossi" award for the best PhD thesis in Astroparticle Physics. The corresponding honorarium is 2000 €.
- Winner of the contest "Science in Shorts", promoted by Springer Nature. Reserved to researchers who published with the Nature group. Prize: 5000 €.

Internships

During the Master degree program in Astrophysics I carried out:

- Internship at the Osservatorio Astronomico di Roma – Monte Porzio, for the analysis of X-ray data from an accreting pulsar, finalized at the characterization of the spin-down process.
- Internship at the Istituto di Astrofisica e Planetologia Spaziali (IAPS) di Roma, for the study of radio and X-ray variability of a peculiar radio galaxy in the perspective of accretion–ejection properties of active galactic nuclei.

Scholarships

- Winner of the scholarship "Incentive for matriculation" given by the University of Rome Tor Vergata, addressed to students with best academic results (1000 € received each of three years of B.Sc. Degree).
- Winner of a scholarship of 600 € offered by the "Istituto Neurotraumatologico Italiano", given to the sons of employees with the best scholastic and academic results (Dec. 2017).
- First place (renunciative) in the selection process for PhD program in Astrophysics in the University of Bologna.
- Third place (renunciative) in the selection process for PhD program in Astrophysics in the University of Roma Tor Vergata.
- Selected for the PhD program in Astroparticle Physics at the School of Advanced Studies "Gran Sasso Science Institute".
- Winner of a post-doctoral scholarship at the PennState University, in cooperation with the Swift Mission Operation Center.

Attended PhD Schools

- SIGRAV International School 2021: Gravity of Compact Astrophysical Objects and Gravitational Waves [01/02/2021 – 05/02/2021]
- Gravitational Waves: a new messenger to explore the universe (Institute Henri Poincaré, Paris) [01/03/2021 – 09/04/2021]
- Scientific Communication in Astronomy (Centro Universitario in Bertinoro) [03/10/2021 – 08/10/2021]

Outreach

- Talk for high school classes (30/11/2022), given at Gran Sasso Science Institute, in occasion of the Sharper event for the European night of researchers.
- Volunteer in the AstroFest nights organized by the PennState department of Astronomy (2023–2025).

Mentorship

I have been assisting the research activity of young researchers and PhD students:

- Maia Williams, PhD candidate at the Northwestern University. Training on the subthreshold search with Swift-BAT/GUANO targeted on O4 GW candidates. Jan 2025 – now.
- Alessio Ludovico De Santis, PhD candidate at GSSI. Project focused on refined analysis of the connection between short GRBs and neutron star merger populations. Oct 2024 – now.
- Sanika Khadkikar, PhD candidate at the PennState University. Project dedicated to link GW parameter estimation the inference of Kilonova and GRB observational properties. July 2025 – now
- Gabriele Sinagra, Master student, University of Palermo. Systematic test of the magnetar model applied on the most up to date complete sample of GRBs with X-ray plateau. Nov 2024 – now