ANGELO SERRECCHIA

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PERSONAL PROFILE

M.Sc. graduating student in experimental astroparticle physics, with a focus on rare event searches and direct dark matter detection. My work spans event reconstruction, photo-sensor characterization, and statistical data analysis, with prior experience applying machine learning techniques to physics problems. Already involved in the DarkSide-20k experiment, I am seeking a PhD position to continue contributing through its commissioning and first data-taking phases.

EDUCATION

M.Sc. Physics, Sapienza University of Rome *2023-Present*

- Curriculum: "Fundamental interactions: theory and experiment" (fully taught in English)
- Weighted average: 29.4/30; Expected final grade: 110/110

B.Sc. Physics, Sapienza University of Rome *2019-2022*

- Weighted average: 27.7/30; Final grade: 109/110

RESEARCH EXPERIENCE

Thesis Work:

- **M.Sc. Thesis – "Characterization of the photo-sensor response and readout for the DarkSide-20k detector with the Proto-0 dual-phase liquid argon time projection chamber prototype"** *Defence Sep 2026*
  Supervisors: Valerio Ippolito, Marco Rescigno, Sandro De Cecco
  - Developed a novel framework to characterize the photo-sensor response of the DS-20k Photon Detector Units, simultaneously measuring two distinct sources of correlated noise.
  - Developed a baseline reconstruction algorithm to better estimate the waveform baseline and monitor signal drift. It is being adapted for deployment in the DS-20k Front-End Processor.
  - Participated in data-taking shifts, detector assembly operations, and Photon Detector Unit testing in the ISO 6 clean room at the INFN Naples laboratory.
- **B.Sc. Thesis – "Study of the WIMP - Argon nucleus interaction and application to the DarkSide detector for the direct search for dark matter"** *Defence Dec 2022*
  Supervisors: Valerio Ippolito, Sandro De Cecco
  - Developed a Python-based model to calculate 90% exclusion limits on WIMP-nucleon cross-sections in DarkSide-50 under varying detector and astrophysical assumptions.

Internship:

- **CYGNO readout system signal characterization – INFN-LNF** *Feb-Jul 2024*
  - Developed a Python framework for event reconstruction and characterization of the PMT readout response, comparing it with the sCMOS optical camera readout of the CYGNO experiment for directional dark matter searches.

PUBLICATIONS

- CYGNO Collaboration (F. D. Amaro *et al.*, including **A. Serrecchia**), "Modeling the light response of an optically readout GEM based TPC for the CYGNO experiment", arXiv:2505.06362.

AWARDS

2nd place – GWOSC Data Challenge *May 2023*

- Ranked 2nd among 500 participants worldwide in the gravitational-wave signal analysis challenge on LIGO/VIRGO/KAGRA data.

ADDITIONAL EXPERIENCE

Courses:

- **5th Int. Summer School on Open FPGA – CAEN [Upcoming]** *Jul 2026*
  - Selected as one of 12 international participants for advanced training on FPGA firmware development using SCI Compiler and real-time DAQ systems.
- **Geant4 advanced course – CERN** *Oct 2024*
  - Hands-on training on Monte Carlo simulation of particle-detector interactions using Geant4.
- **HASCO Summer School – University of Göttingen** *Jul 2023*
  - One-week program on Hadron Collider Physics at the LHC, with hands-on experience in statistical data analysis using ROOT.
- **GWOSC workshop – Gravitational Wave Open Science Center** *May 2023*
  - Hands-on training in gravitational-wave data analysis on LIGO/Virgo/KAGRA data, including matched filtering, and Bayesian parameter estimation with the Bilby library.
- **Machine Learning for Physics – Sapienza University of Rome** *Jul 2022*
  - Final project on antihydrogen annihilation classification with PyTorch, exploring CNNs and dense networks on simulated data from the ASACUSA experiment at CERN.

Conferences:

- **Superconducting Technologies for Dark Matter – Rome** *May 2026*
  - Conferences on novel detection technologies for low-mass dark matter searches.
- **DarkSide-20k Collaboration Meeting – GSSI** *Nov 2025*
  - Preliminary results on the DS-20k baseline studies included in a collaboration talk.

Outreach:

- **OpenLabs – INFN-LNF** *May 2024*
  - Presented the CYGNO experiment at the INFN OpenLabs outreach event, explaining detector mechanics and signal acquisition to the general public.

COMPUTER SKILLS

Operating systems: Linux, Windows
Programming languages: Python, C, C++, Shell Script, LaTeX
Data analysis and simulation tools: ROOT, Geant4, PyTorch, Bilby
Version control: Git (GitHub, GitLab)

LANGUAGES

Italian (native), **English** (proficient – M.Sc. fully taught in English)