FEDERICO **BATTISTI**

Email: federico.battisti4@unibo.it / federico.battisti@bo.infn.it · **Phone:** +39 3341409217
Website: https://www.unibo.it/sitoweb/federico.battisti4

Particle Physics post-doctoral researcher at the INFN and University of Bologna, member of DUNE and SBN. Specializing in accelerator neutrino physics and reconstruction algorithms, with experience at the ANTARES, SBN, ALICE and DUNE experiments in academic and research environments in the EU, UK and US.

RESEARCH AND TEACHING

10/2024 – PRESENT

POST-DOCTORAL RESEARCHER, INFN AND UNIVERSITY OF BOLOGNA

Description: My work focuses on the SAND detector, one of the three Near Detector components of the DUNE experiment. My research, so far, has focused on the production and validation of particle tracking and track formation algorithms, the study of the beam monitoring capabilities of the detector and the development of neutrino interaction analyses.
Supervisor: Nicoletta Mauri (nicoletta.mauri@bo.infn.it)
Other Contacts: Laura Patrizii (laura.patrizii@bo.infn.it)

10/2024 – 03/2025

MASTER'S DEGREE THESIS CO-SUPERVISOR, UNIVERSITY OF BOLOGNA

Title: "Neutrino beam monitoring with the SAND detector and the DUNE near site"
https://amslaurea.unibo.it/id/eprint/35319/
Other co-supervisors: Gabriele Sirri (sirri@bo.infn.it), Matteo Tenti (tenti@bo.infn.it)

09/2023 - 12/2023

PARTICLE PHYSICS LABORATORY TUTOR, UNIVERSITY OF OXFORD

Contacts: Giles Barr (giles.barr@physics.ox.ac.uk)

EDUCATION

10/2020 – 03/2025

PARTICLE PHYSICS DPHIL, UNIVERSITY OF OXFORD

Title: "Neutrino Interactions with a High-Pressure Gas Time Projection Chamber"
Description: Development of a state-of-the-art Kalman Filter tracking algorithm for the ND-GAr detector at the DUNE experiment, evaluation of the detector's performance and investigation of the possibility of using TKI techniques to extrapolate a sample of neutrino-hydrogen interactions in the TPC gas.
https://ora.ox.ac.uk/objects/uuid:ee227fd1-85f6-4292-9fda-5e28dc68e74f
Supervisor: Xianguo Lu (xianguo.lu@warwick.ac.uk) ·
Co- Supervisor: Farrukh Azfar (farrukh.azfar@physics.ox.ac.uk)

10/2017 – 04/2020

PARTICLE PHYSICS MASTER'S DEGREE, UNIVERSITY OF BOLOGNA

Title: "Monitoring of the DUNE Long Baseline Neutrino Beam with the SAND Detector"
https://amslaurea.unibo.it/20447/1/TesiFB.pdf
Grade: 110/110 cum laude · Supervisor: Sergio Bertolucci (sergio.bertolucci@cern.ch)

09/2014 - 09/2017

PHYSICS BACHELOR'S DEGREE, UNIVERSITY OF BOLOGNA

Title: "Study of neutrinos from the galactic plane with ANTARES telescope"
Grade: 110/110 cum laude · Supervisor: Maurizio Spurio (Maurizio.Spurio@bo.infn.it)

PUBLICATIONS

22/11/2024

TITLE: "A Kalman Filter for track reconstruction in very large time projection chambers"

Authors: Federico Battisti, Marian Ivanov, Xianguo Lu
Journal issue: Computer Physics Communications, Vol. 308, March 2025, 109443
https://www.sciencedirect.com/science/article/pii/S0010465524003667

07/07/2022

TITLE: "**The DUNE Near Detector"**

Authors: Federico Battisti on behalf of the DUNE Collaboration · Proceedings for ICHEP 2022
https://inspirehep.net/literature/2619507

INTERNSHIPS AND EXPERIENCE

2020 - PRESENT

COLLABORATOR, DUNE EXPERIMENT

Part of the official DUNE collaboration as a member of the SAND, ND-GAr and ND simulation and software groups

2025 - PRESENT

COLLABORATOR, SBN EXPERIMENT

2022 - 2024

EXTERNAL COLLABORATOR, ALICE EXPERIMENT

External Project Collaborator · Supervisor: Marian Ivanov (marian.ivanov@cern.ch) · Optimization of fast simulation and reconstruction for the DUNE ND-GAr detector with potential applications for ALICE3 and ALICE Run3.
Summary Talk: https://indico.cern.ch/event/1312544

09/2019 –04/2020

INTERN STUDENT, INFN BOLOGNA

Master Thesis internship · Supervisor: Matteo Tenti (matteo.tenti@bo.infn.it) · Project: Simulation and analysis for the KLOE near detector at the DUNE experiment. Additional experience at the Frascati National Laboratories building and testing CRT Modules for the ICARUS experiments.

10/2018 – 04/2019

ERASMUS+ STUDENT, UNIVERSITY OF BOLOGNA

Erasmus+ project - iTHEPHY · Supervisor: Matteo Negrini (matteo.negrini@bo.infn.it) · Project: Study on top-quark measurements at the LHC and beyond in the SMEFT framework, and presentation of the results at the Cargese annual summer-school on high energy physics

08/2018 – 09/2018

SUMMER STUDENT, FERMILAB

University of Pisa- Summer Student Program at Fermilab and other US facilities · Supervisor: Minerba Betancourt (betan009@fnal.gov) · Project: Cosmic background studies for the SBN collaboration using machine learning techniques in the TMVA framework

07/2018 – 08/2018

SUMMER STUDENT, UNIVERSITY OF OXFORD

Oxford Summer Student Program – Moving Knowledge 2018

TALKS, CONFERENCES AND WORKSHOPS

09/04/2025-11/04/2025

IFAE 2025 CAGLIARI

Talk Title: ND-GAr, an innovative high pressure gas TPC for DUNE
Poster: https://agenda.infn.it/event/44314/contributions/259586/

07/07/2022

ICHEP 2022 BOLOGNA

Talk Title: The DUNE Near Detector
Talk: https://agenda.infn.it/event/28874/contributions/169662/

19/04/2022-29/04/2022

LEARNING TO DISCOVER WORKSHOP

Funded attendee · Organized by the Pascal Institute at the University of Paris Saclay
https://indico.ijclab.in2p3.fr/event/5999/

17/04/2021

APS APRIL MEETING 2021

Talk Title: Potential of studying neutrino interactions in the DUNE high-pressure gas time projection chamber via transverse kinematic imbalance
https://meetings.aps.org/Meeting/APR21/Session/L14.3

26/02/2021

XIX INTERNATIONAL WORKSHOP ON NEUTRINO TELESCOPES

Talk Title: Physics potential with the DUNE ND-GAr detector
https://agenda.infn.it/event/24250/contributions/130002/

SKILLS

- **CODING:** Experienced in C++, Python; ROOT, PyROOT, matplotlib and ROOTInteractive libraries; Jupyter Notebooks.
- **PROJECT MANAGING:** Experienced in github both with forking and branching workflows
- **MACHINE LEARNING:** Experienced in the use of ROOT TMVA and python scikit-learn