Sottocornola Simone
Curriculum Vitae et Studiorum

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Appointments

- **DAQ/HLT Run Coordinator** — ATLAS experiment, *January 2021 – Present*
- **Member of the DAQ/HLT Coordination team** — ATLAS experiment, *January 2021 – Present*
- **Member of the EF tracking Custom task force** — ATLAS experiment, *February 2021 – June 2021*
- **Selected as 2020/2021 FTK Deputy and Run Coordinator** — ATLAS experiment, *June 2019*

Working Experience and Education

- **CERN Associate (INFN Similfellow Grant)** — CERN, Geneva (CH), *July 2021 – Present*
  Project: *Development, commissioning and operation of the ATLAS data acquisition system for run 3*
- **PostDoctoral Fellow in High Energy Physics** — INFN, Pavia (IT), *January 2020 – Present*
- **PhD in High Energy Physics** — University of Pavia, Pavia (IT), *October 2016 – January 2020*
  Thesis: *A hardware based tracker for the ATLAS experiment: commissioning and trigger studies*
- **CERN Associate (INFN Similfellow Grant)** — CERN, Geneva (CH), *January 2018 – January 2019*
  Project: *The ATLAS FTK HW tracker: triggering events with signatures containing third generation fermions*
- **University of Pavia research grant** — CERN, Geneva (CH), *April 2017 – September 2017*
  Project: *Validation of a hardware tracker for LHC*
- **Master degree in Physics Magna cum laude** — University of Pavia, Pavia (IT), *October 2014 – October 2016*
  Thesis: *QA/QC of the MicroMegas Pavia Readout Panels for the Muon Spectrometer Upgrade of the ATLAS Experiment*
- **Bachelor's degree in Physics** — University of Pavia, Pavia (IT), *July 2014*
  Thesis: *FTK: un tracciatore hardware per il sistema di trigger di ATLAS*

Research activities

- **TDAQ** January 2020 – Now

  I am leading the re-commissioning activities of the ATLAS TDAQ system, with the goal of reaching system readiness for the beginning of the data taking period in 2022. I was appointed ATLAS Run Coordinator for the DAQ and High Level Trigger (HLT) systems in January 2021. As DAQ/HLT Run Coordinator I am responsible for leading a team of dozens of experts in all the system upgrade activities: the commissioning of the new FELIX and SWRod readout path; the rolling replacement and commissioning of the hardware; the integration of the new HLT multithreaded software framework. Moreover, I am responsible for all the operation activities: the review and update of the Run-2 operation tools and the design of the required new ones; the organization of the Run Control shifters and their training, as well as the training and organization of the TDAQ experts on-call; the organization of the TDAQ Technical Runs and their tests; the organization of the DAQ/HLT participation to the ATLAS Milestone weeks as well as providing support to the different subsystems using the TDAQ infrastructure; the organization and scheduling of the different TDAQ interventions and tests.

- **ATLAS data-flow** October 2019 – Now

  I'm the responsible of the Data Collection Manager (DCM) application, a mission critical application for the ATLAS TDAQ system. This server-like application is responsible for retrieving and providing to the HLT all the required data (L1, ROB fragments), for building the Full Event after the HLT decision, and for sending this data to the ATLAS transient storage. Moreover, I play a leading role in the integration of the new multithreaded Athena implementation in the online applications, and I'm also acting as a link between the ATLAS DAQ and the HLT communities.

- **HTT project** October 2019 – Now

  I'm the responsible, librarian, main designer and developer of the online software of the project (which performs the configuration, control and monitoring of the system electronics). I created a software environment that eases the development of standalone tools during the R&D phase of the project while ensuring compatibility with the central ATLAS TDAQ framework. I developed a high-level interface for the IPBus communication protocol to ensure uniform development of the communication software between the different electronic components.

- **NSW DAQ and Data Quality** November 2019 – Now

  I'm the responsible of the MicroMegas OHP and DQMF development. I started the development of the NSW Data Quality Monitoring infrastructure, providing a fully functional skeleton to the subsystem developers. I took part in the early-stage integration of the NSW muon detectors in the ATLAS DAQ system. In particular, I performed an Object Oriented refactoring of the standalone configuration and calibration software, essential for the integration into the TDAQ framework. Moreover, I participated in the creation of a suite of tools to automatically generate the electronics configuration databases.

- **FTK online software** November 2016 – October 2019

  I was the responsible, librarian, and main contributor to the software design and development. I developed the release-building framework as well as the versioning and continuous integration systems. I had a leading role in the design and development of the online software (required to configure, control and monitor the electronic components) and its integration in the ATLAS TDAQ framework. I coordinated and supported the board specific development tasks, leading a software developer team of more than 10 experts. I developed automatic recovery procedures for the system, based on a manager application responsible for the electronics re-configuration. I lead the multithreading refactoring of the software framework, which greatly shorted the system configuration time and ensured that FTK would be compatible with the requirements of the transitions times of the ATLAS Finite State Machine.

- **FTK commissioning** November 2016 – October 2019

  I had a leading role in the commissioning of the FTK system. I participated in the system installation, in the testing of the electronic boards and in the optimization of the system configurations. As the liason between the commissioning and the online software, I regularly identified needs and created new tools to boost productivity. They include a tool for the automatic generation of the configurations, a wrap-up tool for the coherent monitoring of all the system boards, and a multitude of other tools that eased the commissioning process of the system. All of these allowed the commissioning team to focus time on the important debugging instead of technical hurdles. Finally, I took part in all the system testing activities, and I performed shifts on a regular basis as expert on-call. I was selected to be the Run Coordinator of the system for the years 2020-2021.

- **FTK power and cooling system** March 2018 – February 2019

  I performed extensive studies to characterize and optimize the custom VME crates used by the system, allowing us to avoid doubling the number of VME crates for power density reduction. In particular, I characterized the power consumption and temperature profiles of the project hardware; I performed studies that reduced the power consumption of the Associative Memory boards; I contributed to the development, commissioning and optimization of the custom VME crate cooling system (hardware, firmware and control software).

- **ATLAS trigger** January 2018 – September 2019

  I worked on the development of new trigger chains exploiting the great increase of tracking information at trigger level provided by the new Fast TracKer (FTK) system. In particular, I developed and proposed a new τ trigger chain that would have drastically increased the τ lepton trigger selection efficiency at low p_T. Moreover, I studied improvements in signal acceptance and statistical significance that the inclusion of the proposed chain would have brought to the search for a charged Higgs boson in the $h^+ \to \tau\nu$ decay channel. Finally, I contributed to studies of possible improvements to b-jet triggers using tracking information from FTK.

- **MicroMegas detectors for NSW** September 2015 – December 2016

  I developed procedures needed for the construction of the MicroMegas detectors for the ATLAS NSW upgrade. In particular, I developed QA/QC procedures for the NSW Readout panel quality certification, I integrated the tools required for the panel assembly (arduino-based automatic gluing system, data acquisition from the laser used for planarity measurements, etc.), and I developed the software needed both for the data acquisition and for the data analysis of the production activities.

Moreover, I worked at CERN on the validation of the preproduction PCBs and I performed studies on the quality of the boards. Finally, I participated in the test beam of the first NSW MicroMegas chamber prototype and I performed the first studies on performance variations with X-ray irradiation under deformation.

International schools attended

- **ISOTDAQ** — Amsterdam (ND)
  International School of Trigger and Data Acquisition — *February 2017*
- **International spring school Bruno Touschek** — Frascati (IT)
  Nuclear, Subnuclear and Astroparticle Physics school — *May 2018*

Conferences

International conferences:

- **IEEE Real Time 2020** — Virtual
  Poster: "Cooling and Timing Tests of the ATLAS Fast Tracker VME boards" — *October 2020*
- **CHEP (Computing in High Energy Physics)** — Sofia (BG)
  Talk: "Software based control and monitoring of a hardware based track reconstruction system for the atlas experiment" — *July 2018*

International workshops:

- **Young Researcher Workshop: Physics Challenges in the LHC Era** — Frascati (IT)
  Talk: "FTK: An Hardware based Tracker for the ATLAS Experiment" — *May 2018*

International collaboration workshops:

- **ATLAS TDAQ Week** — CERN (CH)
  Convener of the DAQ/HLT session of the ATLAS TDAQ week — *March 2021*
- **ATLAS Week** — CERN (CH)
  Talk: "Integration of the new AthenaMT-based High Level Trigger in the ATLAS online data-flow" — *February 2021*
- **ATLAS Trigger Workshop** — Virtual
  Talk: "DAQ toward Run-3" — *November 2020*
- **ATLAS TDAQ Week** — CERN (CH)
  Talk: "Feedback from HLT integration to TDAQ data-flow" — *March 2020*
- **ATLAS Week** — CERN (CH)
  Convener of the Upgrade session of the ATLAS collaboration week — *February 2020*
- **ATLAS TDAQ Week** — CERN (CH)
  Talk: "FTK online software status and plans" — *March 2019*

- **FTK kickoff workshop for LS2** — Geneva (CH)
  Talk: "FTK online SW status and future plans" — *January 2019*
- **ATLAS TDAQ Week** — Krakow (PL)
  Talk: "FTK status report" — *September 2018*
- **ATLAS TDAQ Week** — CERN (CH)
  Talk: "FTK online SW status" — *May 2018*
- **FTK YETS end operation workshop** — CERN (CH)
  3 talks about the status and future developments of the FTK online SW — *March 2018*
- **FTK kickoff workshop** — CERN (CH)
  3 talks about the FTK online SW status and plans — *January 2018*

National conferences:

- **National Congress of the Italian Physics Society** — Padova (IT)
  Talk: "Construction and QA/QC of the MicroMegas Readout panels for the Muon Spectrometer upgrade of the ATLAS experiment" — *September 2016*

National collaboration workshops:

- **Workshop ATLAS Italia** — Pavia (IT)
  Talk: "Status and perspective for FTK in 2018" — *October 2017*

Moreover, I have been the chair of the weekly FTK online software meeting and the HTT online software meeting and I'm currnetly the chair of the ATLAS DAQ/HLT software and operation meeting. I presented regular reports at the different collaboration meetings, such as FTK meetings, HTT meetings, NSW Data Quality meetings, DAQ and Trigger meetings, ATLAS operation meetings. I'm part of the DAQ/HLT Coordination team, and I report monthly on the status of the system in the DAQ/HLT Coordination meeting.

Publications

- **Selected publications:**
  - Sottocornola S., et al. "Cooling and Timing Tests of the ATLAS Fast Tracker VME boards", IEEE Transactions on Nuclear Science (2021), DOI:10.1109/TNS.2021.3089048.
  - ATLAS collaboration, "The ATLAS Fast Tracker (FTK) System", JINST 16 (2021) P07006, DOI:10.1088/1748-0221/16/07/P07006.
  - Alexopoulos T., et al. "Construction techniques and performances of a full-size prototype Micromegas chamber for the ATLAS muon spectrometer upgrade", Nucl.Instrum.Meth.A 955 (2020) 162086, DOI:10.1016/j.nima.2019.04.040.
  - Sottocornola S., "Software based control and monitoring of a hardware based track reconstruction system for the ATLAS experiment", 10.1051/epjconf/201921401021, EPJ Web Conf. Volume 214, 2019.

- Sottocornola S., "FTK: an hardware based tracker for the ATLAS experiment", Frascati Physics Series Vol. 67 41-48 (2018), https://cds.cern.ch/record/2677371.
- Iizawa T., Sottocornola S., et all. "Performance Studies of the Associative Memory System of the ATLAS Fast Tracker" - 2018 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC 2018), Sydney, Australia, 10 - 17 Nov 2018.

- **Atlas collaboration publications:**

  Qualified as ATLAS author since May 2017.
  At the moment, I'm co-author of **328** ATLAS papers.
  The full list of publications can be found here: https://inspirehep.net/authors/1471782

Teaching activities

- **Lectures for the course "Elementi di Fisica"** — Pavia (IT)
  University of Pavia, degree in Natural Science — *2020 – Now*
- **Lectures for the course "Metodi informatici della fisica"** — Pavia (IT)
  University of Pavia, degree in Physics — *2016 – 2018*
- **Supervisor for the thesis "Machine Learning Techniques in High Energy Physics"** — Pavia (IT)
  University of Pavia, thesis candidate: Marco Acerbis — *2018*
- **CERN internship supervisor** — CERN (CH)
  Project: Commissioning of the updated event-selection computer farm of the ATLAS experiment — *Summer 2021*
- **Summer student Mentor** — CERN (CH)
  CSU NUPAC program — *Summer 2018*

Outreach activities

- **Activities proposed at the European Researcher Night** — Pavia (IT)
  2016 – Now
- **Talk "Il CERN di tutti noi"** — Sondrio (IT)
  Rotari Club Sondrio — 18^{th} *February 2020*
- **Talk: "Andar per CERN"** — Chiavenna (IT)
  Liceo scientifico Leonardo da Vinci — 10^{th} *May 2019*

Geneva, 14/07/2021 — Sottocornola Simone