Matteo Franchini

CURRICULUM VITAE

First Name: Matteo
Family Name: Franchini
Current Employment: Postdoctoral Fellow at Alma Mater Studiorum University of Bologna.

Research responsibilities:

- Responsible of the whole software of the FOOT experiment *(2017-ongoing) [N-12]*;
- Analysis Coordinator of the ATLAS analysis group called *Heavy Lepton Multiplet search (2018-ongoing)*;
- Editor of an ATLAS notes about SeeSaw exotic search *(2018) [N-11]*;
- Run-coordinator of the ATLAS forward detectors *(2018)*;
- Boosted Top Liaison in the ATLAS collaboration *(2014-2015)* (contact person for boosted top analyses and performances in the top group);
- Editor of two ATLAS notes on ttbar cross section *(2013-2016)* [*N-6*, *N-7* led to the published paper *P-1*];
- main developer of a package in the official ATLAS analysis framework for the top group *(2014-2015)*.

Overview

- Active member of both the ATLAS and the FOOT collaborations;
- Currently employed as research associate at Alma Mater Studiorum University of Bologna since 2014;
- Obtained the Scientific National Qualification ("Abilitazione Scientifica Nazionale") for the Settore Concorsuale 02/A1 "Fisica Sperimentale delle Interazioni Fondamentali" in date 05/10/2018;

- Obtained twice a one-year long CERN association contract (from 01/01/2013 to 31/12/2013 and from 01/07/2014 to 30/06/2015);
- Based at CERN since the 1st of September 2012 to end 2016;
- Active member of the following analyses in ATLAS:
  - Measurement of J/ψ cross section and polarisation (2010-2011) *[T-1]*;
  - Resolved $t\bar{t}$ differential cross section measurement in the lepton+jets channel at $\sqrt{s}$=7 TeV (2012-2013) *[P-2, N-10]*;
  - Boosted $t\bar{t}$ differential cross section measurement in the lepton+jets channel at $\sqrt{s}$=8 TeV (2013-2015) *[P-1, N-5, N-6, N-7]*;
  - Top tagging performance studies on high p_T jets using specific boosted algorithms *[P-5, N-2, N-3, N-4]*;
  - Study of the production of the Higgs boson in association with $t\bar{t}$ pairs ($H\rightarrow bb$; $t\bar{t}\rightarrow \ell\nu bbqq$) in the boosted regime at $\sqrt{s}$=8 TeV (2014-ongoing) *[N-1, P-8, P-9]*;
  - Search for doubly charged Higgs boson production decaying in multi-lepton final states (2017 - ongoing)[*P-11*];
  - Search for heavy lepton production in the SeeSaw-TypeIII model, decaying in multi-lepton final states (2017 - ongoing)[N-11];
  - Search for heavy neutrino production compatible with the SeeSaw-TypeI model and decaying in multi-lepton final states (2018 - ongoing);.
- Presented 3 ATLAS talks at international conferences (*DIS2013, Les Rencontres de Physique* de *La Thuile 2015, Recontre de Blois 2017*). 5 talks at national conferences (PP@LHC2016, *SIF* and *ATLAS Italia*), 4 posters at international conferences, several workshop participation;
- Responsible of the whole software (reconstruction and analysis) of the FOOT experiment (CDR at https://web.infn.it/f00t/index.php/it/public-links), coordinating a working group of ~20 people;
- Held a P.h.D course "Physics of Hadrontherapy" at the University of Bologna (A.A. 2017/18);
- Tutor of three courses at the University of Bologna during Academic years 2010/11, 2011/12, 2017/18;
- "Rappresentante degli assegnisti di ricerca" from 2018;
- Author of 598 papers, 6 proceedings and 12 ATLAS notes and public documents.

Education

2014, 7th of March: PhD in Particle Physics at Alma Mater Studiorum University of Bologna.
Title: "**Measurements of $t\bar{t}$ differential cross section at the ATLAS experiment in *pp* collisions at $\sqrt{s}$ = 7 *TeV* and $\sqrt{s}$ = 8 *TeV***", *CERN-THESIS-2014-051 [T-1],* (Advisors: Ch.mo Prof. A. Zoccoli, Dr. R. Spighi, Dr. M. Negrini).

2010: Master Degree in Physics (Laurea Magistrale) - 109/110 - Alma Mater Studiorum University of Bologna.
Title: "**Study of the J/ψ production in the muon decay channel in the ATLAS experiment**", *CERN-THESIS-2010-134 [T-2],* (Advisors: Ch.mo Prof. A.Zoccoli, Dr. R. Spighi).

2008: Bachelor degree in Physics - 110/110 cum laude - Alma Mater Studiorum University of Bologna.
Title: "**Analisi della simulazione di muoni atmosferici per l'esperimento NEMO-FASE2**", (Advisor: Prof. M. Spurio) *[T-3]*.

Research Activity

Bachelor thesis - NEMO experiment

During the Bachelor thesis *[T-3]*, Dr. Matteo Franchini was involved in the study of neutrino physics, especially from solar and intergalactic sources, participating to the design project of the trigger for the NEMO experiment.

Master Thesis - J/ψ polarisation and cross section

During his master thesis, Dr. Matteo Franchini measured the differential cross section and the polarisation of the J/ψ meson produced in proton-proton collision at LHC. He performed this analysis using the very first collision data collected by the ATLAS experiment during 2010. The cross section and, especially, the polarisation measurement are fundamental in order to discriminate between two possible theoretical models for the heavy meson production, the Color Singlet Model (CSM) and the Color Octet Model (COM). His thesis is the first document in the ATLAS collaboration containing a preliminary measurement of the cross section and polarisation of the J/ψ meson using the first data (50 nb^{-1} of luminosity) acquired by ATLAS; he presented his results at a conference *[XI]* and during a school of physics *[XII]*.

Top/anti-top differential cross section

Since the beginning of his Ph.D., Dr. Matteo Franchini has been involved in the measurement of the differential production cross section of top/anti-top quark pair ($t\bar{t}$) at the ATLAS experiment. Top quark physics is one of the main topics in the ATLAS physics program both as a test for the Standard Model (SM) predictions and as a major background to many searches for new physics. During the first two years of his Ph.D. he was one of the main code developers for the cross section measurement of the $t\bar{t}$ production in the lepton plus jets decay channel on the events collected by ATLAS in 2011 (5 fb^{-1} of integrated luminosity) at center of mass energy of 7 TeV *[N-10, P-2]* presenting the results at *[II, III, IV, CP-1, CP-2]*. Moreover, he closely collaborated with the analysis team that was performing the same measurement using the data collected the year before (2010) *[P-3]*. He was specifically involved in the study and test of the most suitable unfolding technique to the specific analysis case and its implementation in the analysis code. The unfolding allows to produce a final differential measurement accounting for efficiency and detector bin-to-bin migration effects at the same time. Different unfolding regularisation schemes have been considered (Iterative Bayesian, Single Value Decomposition (SVD) and Matrix Inversion) to compare their performances in terms of bias and impact on final uncertainty, gaining an improvement up to the 15%.

Boosted top/anti-top differential cross section

In 2013, as a Ph.D. candidate, he obtained the position of CERN-Associate (from 01/01/2013 to 31/12/2013). Starting from the experience gained from the past analyses, he worked on the $t\bar{t}$ differential production cross section measurement at high transverse momentum ($p_T > 300$ GeV/c), called *boosted* regime, using the ATLAS data collected in 2012 at center of mass energy of 8 TeV. These events have a peculiar signature that differs from the low p_T (*resolved*) regime ($p_T < 300$ GeV/c). In fact the jets coming from the products of highly boosted particles hadronically decaying, partially overlap one each other due to the relativistic Lorentz boost. Standard reconstruction algorithms are not able to satisfactorily disentangle these kind of jets because they can not assign the correct calorimeter clusters to the proper decay shower, leading to reconstruct jets with a wrong kinematic. New jet reconstruction and identification algorithms have been developed to recover the considerable efficiency loss by gathering all the hadronic showers originated by the same particle decay products into a single, larger, jet that will have the kinematic properties of the initial particle. These jets are then processed by specific algorithms to correct the kinematic for the larger pile-up and background contributions and then identified as effectively coming from the proper physical object (*tagging algorithms*). This strategy, not only allows improvements in the event selection and reconstruction efficiency but also the suppression of the combinatorial background by reducing the number of jets in the reconstruction. The identification strategies take advantage of the particular substructure these kind of larger jets have and many different algorithms based on that have been developed and used so far.

The boosted $t\bar{t}$ differential cross section measurement provides a fundamental test of the Standard Model and allows the estimation of one of the main backgrounds for many Higgs boson and beyond SM searches. Dr. Matteo Franchini has been one of the main analysers for this measurement, developing the full-chain analysis code, optimising the event selection, and implementing and testing the unfolding procedure. He also implemented and deeply studied the covariance of the cross section distribution, a necessary step for the χ^2 determination that he provided in comparison with different Monte Carlo predictions. For all the analysis duration (2013-2015) he has been one of the editors of the related internal and communication notes *[N-6, N-7]*, one of which has been presented at the TOP2014 conference *[N-5]*. The final measurement has been later published in the paper *[P-1]* in 2015, with improved and more complete results. Dr. Matteo Franchini presented this results during a conference talk *[II]* and in two poster sessions *[VII, IX]*. During this analysis, Dr. Matteo Franchini collaborated frequently and profitably with the colleagues performing the $t\bar{t}$ differential cross section measurement in a *non-boosted* regime at $\sqrt{s}$ = 8 TeV because of the close connections between the two analyses.

Boosted top tagging

The recognition of highly boosted objects is crucial in the present and future LHC energy regime where particles are produced with the highest energies and p_T ever reached in collider physics. Dr. Matteo Franchini has then continued his commitment on this topic, studying a newly proposed tagger algorithm for boosted objects called *Template Overlap Method* (*TOM*). He evaluated the algorithm's performance compared to other methods and its applicability to top quark physics analyses as well as its extension to tag also Higgs bosons and leptonic-decaying top quarks. He contributed to the production of a performance comparison paper between different boosted top tagger algorithms *[N-4, P-4, P-5]*. He also collaborated to the production of an internal note on early performance studies of top tagging algorithms at 13TeV *[N-2, N-3]*.

Thanks to his contributions in the mentioned analyses and studies, he was obtained the one-year role as *Top Boosted Liaison* (from the 1st of April 2014) and of responsible of an analysis package, called *TopD3PDBoosted*, specifically designed for *boosted* analyses. It was part of the official analysis framework of the ATLAS top group. As *Top Boosted Liaison,* he was the reference person for all the boosted analyses and performance studies in the top quark sector, counting around 40 people in total.

His job on the boosted object reconstruction, both on the coordination and on the algorithm optimisation, has been used in the top quark related analyses studying high p_T regions. His contribution has been particularly notable in the search for $t\bar{t}$ resonances at 8 TeV *[N-8, N-9, P-6, P-7]*. Due to this experience, he has been selected for conference talks *[I, III, IV, VI, CP-2]* and a software tutorial *[V]*.

Search for ttH production

In 2014, Dr. Matteo Franchini started working on the measurement of the Higgs boson production in association with a $t\bar{t}$ pair in the boosted regime at 8TeV *[P-10]* and 13TeV. During the R*unII* (2015-2018) data taking, enough significance will be reached both to firmly prove SM predictions on this specific channel and to search for possible deviations from the SM predictions in the boosted region. Dr. Matteo Franchini focused his efforts on the study of the specific decay configuration where the two W bosons produced by the $t\bar{t}$ system decay one leptonically and the other hadronically, and the Higgs boson decays in two *b* quarks. This is the decay channel that would gain the most by the application of boosted specific algorithms being characterised by an environment dense of jets. Moreover, boosted techniques can be applied at both the top quarks and the Higgs boson. Dr. Matteo Franchini is specifically working at the optimisation of boosted algorithms on this specific analysis. He is also working on the application and optimisation of multivariate selection techniques in order to maximise the signal significance. This is a crucial point of the analysis due to the relative low number of expected signal events, especially in the high p_T part of the phase-space. The boosted result has been merged with the one from the resolved analysis in order to improve the statistical limit on the $t\bar{t}H$ production. The results are published in a joint paper [*P-8*] and detailed in the relative ATLAS note [*N-1*]. These results contributed to the decisive observation of the $t\bar{t}H$ production mechanism which has been published in 2018[*P-9*].

Multilepton Exotic searches

In 2017, Dr. Matteo Franchini started his activity on the ATLAS exotic search for the production of massive heavy lepton pair (N^0 $L^{\pm}$) predicted by the Type III SeeSaw mechanism. This model gives a possible explanation of the neutrino masses via the decoupling of new heavy degrees of freedom, implying the existence of new massive mediators which signatures could be observed if their masses are supposed not too high (less than TeV). Dr. Matteo Franchini is developing the full analysis selection and infrastructure in the *full-lepton* decay channel. He is also collaborating in the *lepton+jets* decay channel with performance studies mainly on the diboson background. Dr. Matteo Franchini has been editor of a public document giving a first result obtained with 36fb^{-1} of integrated luminosity, excluding new leptons lighter than 580 GeV [*N-11*].

In 2017, Dr. Matteo Franchini also started working in the ATLAS exotic search for doubly charged Higgs bosons decaying to pairs of electrons and/or muons of the same sign, with the goal of improving the selection of the latest analysis ended in 2017 and extending its result with the full statistics that will be recorded until the end of the R*unII* (2015-2018) data taking *[P-11]*. He contributed to this published result with background performance studies and particle level phase-space implementation on RIVET, a widespread code used by theorist to cope with some of the detector specific uncertainties when comparing experimental data with their models. The existence of doubly charged Higgs bosons ($H^{\pm\pm}$) has been predicted by several extensions of the Standard Model as part of an extended Higgs sector having a triplet of Higgs bosons: in addition to the neutral Higgs boson, charged and doubly charged

Higgs bosons are part of this triplet. The origin of neutrino masses and mixing can be attributed to this triplet, which can couple to Higgs and lepton doublets. This analysis is closely bounded to the *Heavy Lepton Multiplet* and a fruitful collaboration and information exchange is constantly maintained.

From June 2018, Dr. Matteo Franchini is the Analysis Coordinator of the ATLAS exotic group *Heavy Lepton Multiplet* including three separate analyses: the heavy leptons searches predicted by the TypeIII SeeSaw model, the heavy Majorana neutrino search and the search of vector-like tau leptons. These analyses are related by similar multi-leptonic final states and can therefor take great advantage by a close collaboration and by the sharing of analysis tools and codes. The duty of the Analysis Coordinator is to coordinate and harmonise the different analysis teams to produce a final combined paper using the full ATLAS runII statistic, collected until the end on 2018.

Technical activities in ATLAS

Dr. Matteo Franchini worked on different hardware tasks. During his master thesis, he analysed data from a beam test for the LUCID detector (the official ATLAS luminometer) contributing to its first calibration. LUCID is now installed in the ATLAS detector giving the official luminosity to the experiment *[P-12]*.

For the ATLAS qualification task, Dr. Matteo Franchini collaborated to the FastTracker (FTK) project for the ATLAS detector upgrade presenting his results *[VIII]*. Parts of the work done in this context has also been presented at [*CP-5, CP-6*]. This is a project based on Associative Memories that allow fast track recognition for triggering purposes. Within this project, he developed part of the software to control the hardware acquisition board and to interface it with the DAQ system that controls all the ATLAS detector acquisition activities.

Dr. Matteo Franchini collaborated at the maintenance of the RPC muon system installed in the ATLAS detector concentrating his efforts mainly on the hardware interventions for the detector maintenance and on the use of the Data Control System (DCS) software.

In 2018, he worked as run-coordinator of the forward-detector for the ATLAS experiment. This responsibility role consists in the periodically coordination the forward-detector activity, and their integration with the ATLAS management plans and with the other ATLAS sub-detectors schedule.

FOOT experiment

In June 2016, Dr. Matteo Franchini joined the FOOT (FragmentatiOn Of Target) collaboration *[N-12, CP-7, CP-8]*. The main goal of the FOOT experiment is to improve hadrontherapy treatments by performing precise measurements (level of 5%) of proton-Nucleon and Nucleon-Nucleon fragmentation cross sections at hadrontherapy energies (150-400 MeV/n) in the case of mildly-heavy fragments ($3 < A < \sim 20$) production. Hadrontherapy consists in using hadronic beams (mainly made of protons, Carbon (*C*) or Oxigen (*O*) ions) to kill cancer cells. The crucial point of hadrontherapy, with respect to other tradition radiotherapy, is the great effectiveness in killing cancer cells with a little damage to

the surrounding healthy cells. This characteristic is granted by the typical dose deposition spectrum (*Brag peak*) where the release of the energy is mostly concentrated at the end of the particle path.

In hadrontherapy, one of the main sources of uncertainty in the estimation of the biological damage comes from the fragmentation of the beam particles with the body elements, the most abundant of which are again Hydrogen (proton), *C* and *O* nuclei. This is due to the current lack of fragmentation cross section measurements in the hadrontherapy energy range. This leads to a poor Monte Carlo simulation of the damages to the patient that must be partially recovered by long experimental tests before every single patient treatment. The FOOT experiment aims to fulfil this knowledge gap, allowing faster clinical treatments with a consequently cost reduction.

FOOT is a forward and compact detector (1.5 meter long with an angular acceptance of about 10 degrees) formed by a scintillator foil as trigger and start counter, a beam monitor drift chamber, a tracking system composed by two tracking silicon pixels detectors (Vertex and Inner Tracker) and an outer Micro-Strip tracking detector; a TOF plastic scintillator will measure the fragments' Time Of Flight (TOF) and energy loss; a BGO calorimeter will collect the fragments' kinetic energy. An emulsion detector will be also used in dedicated runs to estimate light ($A < 5$) fragments production, emitted also at greater angles not covered by the previous setup. The detector will collect the fragments produced by both C and O beams with an energy range of 150-400 MeV/n, colliding with a C or C_2H_4 targets.

The results will also help improving and validating existing nuclear models and will give fundamental information in human radio-protection for long-term manned space missions. In order to fulfil the latter goal, a more energetic ion beam (including alfa particles) will be used, ranging form 400 to 700 MeV/n.

Dr. Matteo Franchini is the responsible of the software of the whole experiment. He is also the responsible and main developer of the FOOT track reconstruction code, based on a Kalman Filter algorithm, evaluating the fragments momentum and trajectory that is essential for isotopes identification and calorimetric clusters matching. He presented the status of the experiment in a poster *[VIII]* winning the conference best-poster award (3rd place).

Awards

The 2013 High Energy and Particle Physics Prize, for an outstanding contribution to high-energy physics, was awarded to the ATLAS and CMS collaborations, "for the discovery of a Higgs boson, as predicted by the Brout-Englert-Higgs mechanism".

Winner of the best poster award (3rd place) at the European Physics Conference EuNPC2018 *[VIII]*.

Languages

English: fluent speaking, writing and reading.

French: elementary speaking and reading.

Japanese: elementary speaking.

Italian: fluent (mother tongue/native).

Computing Skills

Dr. Matteo Franchini has a deep knowledge of the the following program languages: C, C++, OpenCL and OpenCC, Java, Python, Bash and Wolfram Mathematica and of the specific analysis programs ROOT and ATHENA (ATLAS experiment standard software). He is an active user the GRID system for the distributed and parallel computing, for analysis of large datasets of LHC events collected in proton-proton collisions. He is a holder of the ECDL computing European license in most common informatics features.

Outreach Activity

- Active member of ATLAS Italia outreach since 2016.
- Guide at the Museum of Physics of the University of Bologna site 2017.
- Active member of the CICAP since 2016.
- Co-organiser of the “Alternanaza Scuola/Lavoro “ in 2017 and 2018 project hosted by the INFN
- Collaboration contract as co-organiser of the “Alternanaza Scuola/Lavoro 2017” project hosted by the University of Bologna .
- Collaboration at the European Research Night 2017 and 2018.
- Organiser of a science introduction module in elementary school San Vincenzo de Paoli in Bologna in 2017.
- Photographer and member of the ATLAS outreach group from 2015 to 2017.
- Maintainer of the FOOT experiment web page.
- Speaker at the European Research Night 2015.
- Member of the organisation of the European Research Night 2014.
- ATLAS guide at CERN for the ATLAS detector and underground visits since 2014-16.
- Guide at “la Scienza in Piazza”, a mostly privately funded outreach project in Bologna, lasting one week, during 2011 and 2012.

Teaching

Obtained the Scientific National Qualification ("Abilitazione Scientifica Nazionale") for the Settore Concorsuale 02/A1 "Fisica Sperimentale delle Interazioni Fondamentali" in date 05/10/2018.

He held the P.h.D. course "Physics in Hadrontherapy" at the University of Bologna (A.A. 2017/18).

In 2010 and 2011 Dr. Matteo Franchini has been Teaching Assistant in the "General Physics" course held by Prof. R.Spighi at the Energy Engineering department at the Alma Mater University of Bologna.

He is Teaching Assistant for the "Electromagnetism" course held by Prof. Antonio Zoccoli at the Physics Department at the Alma Mater University of Bologna (A.A. 2017/18). He is also part of the "commissione d'esame" for the following teaching courses:

- ⋆ "Elettromagnetismo", course: "Laurea in Fisica" held by Prof. Zoccoli;
- ⋆ "Fenomeni ondulatori", course: "Laurea in Fisica" held by Prof. Villa;
- ⋆ "Fisica generale T-2", course: "Laurea in Ingegneria elettronica e telecomunicazioni" held by Prof. Villa;
- ⋆ "Fisica generale T-B", course: "Laurea in Ingegneria civile" held by Prof. Sioli;
- ⋆ "Fisica generale T-2", course: "Laurea in Ingegneria informatica" held by Prof. Rinaldi;

He has been the supervisor of the following students:

- P.h.D. thesis students:
  - Silvia Biondi during her thesis (2014 - 2017) on the *"Study of the associated production of the Higgs boson with a top quark pair in a boosted regime in the ATLAS experiment at LHC",* https://cds.cern.ch/record/2285672;
- Master thesis students:
  - Federica Fabbri during the thesis (2014) *"Measurement of ttbar production differential cross section at* $\sqrt{s}$ *= 8 TeV at ATLAS"* available here http://amslaurea.unibo.it/7599/ ;
  - Riccardo Ridolfi during his thesis (2017/18) on the "Study of the track reconstruction in the FOOT experiment for Hadrontherapy" https://web.infn.it/f00t/index.php/it/public-links.
  - Giuseppe Carratta during his thesis (2018) on the *"Search for type-III seesaw heavy leptons using proton-proton collisions at* $\sqrt{s}$ *= 13 TeV with the ATLAS detector"* http://www.infn.it/thesis/thesis_dettaglio.php?tid=12714
  - Pietro D'Angelo (Energetic Engineer student - 2017) during his internship (2017) at the department of Physics on the project *"Costruzione e studio di prestazioni di celle di Graetzel"*;
  - Marco Palma (Energetic Engineer student) during his internship (2017) at the department of Physics on the project *"Costruzione e studio di prestazioni di celle di Graetzel"*;

- Bachelor thesis students:
    - Federica Fabbri during hers thesis (2012) on the study of different unfolding methods in the measurement of the differential production cross section of $t\bar{t}$ quark pair with the title *"Studio delle tecniche di deconvoluzione utilizzate nell'analisi della sezione d'urto differenziale della produzione di coppie top-antitop all'esperimento ATLAS",* https://web.infn.it/f00t/index.php/it/public-links*;*
    - Enrico Vezzali *(Electronic Engineering student)* during his thesis (2017) on the implementation of a DAQ system on FPGA board for the FOOT experiment "*Sistema di DAQ per studi sulla terapia adronica: progetto in VHDL e implementazione su FPGA*", https://web.infn.it/f00t/index.php/it/public-links;
    - Francesca Neri during hers thesis (2017) on the *"Performance study of Kalman Filter track reconstruction algorithms in the FOOT experiment",* https://web.infn.it/f00t/index.php/it/public-links.

Contributions at Conferences/Workshops/Schools

I. M. Franchini (for the ATLAS collaboration) – "**Single Top production in ATLAS and CMS**" - Les Rencontres de Physique de Blois (Blois 2017) in Blois (France), *proceeding publication ongoing*;

II. M. Franchini (for the ATLAS collaboration) – "**Top Quark Production Measurements with ATLAS**" - Les Rencontres de Physique de la Vallée d'Aoste (La Thuile 2015) in La Thuile (Italy);

III. M. Franchini (for the ATLAS collaboration) – "**Intrinsic top quark properties - top mass, charge and polarisation**" - XXI International Workshop on Deep-Inelastic Scattering and Related Subjects (DIS 2013) in Marseille (France), proceeding: DOI:10.22323/1.191.0192;

IV. M. Franchini (for the ATLAS, CMS and LHCb collaborations) – "**The top quark physics**" - PP@LHC 2016 in Pisa (Italy), proceeding DOI:10.22323/1.191.0192.

V. M. Franchini – "**run2 Analysis Tutorial**" - XI ATLAS Italia Workshop 2015 in Cosenza (Italy);

VI. M. Franchini – "**Jets & Boosted Objects**" - X ATLAS Italia Workshop 2015 in Milan (Italy);

VII. M. Franchini – "$t\bar{t}$ **differential cross section in lepton+jets channels at ATLAS**" (poster) - the first Asian European Pacific School of High Energy Physics (AEPSHEP 2012) in Fukuoka (Japan), proceeding: CERN-2014-001, https://cds.cern.ch/record/1443909?ln=en;

VIII. M.Franchini - "**Track reconstruction of nuclear fragments in hadrotherapy with the FOOT experiment**" (poster) - *proceeding publication ongoing* - winner of the best poster award (3rd place) European Physics Conference EuNPC2018 in Bologna (Italy) http://www.eunpc2018.infn.it/poster/;

IX. M. Franchini – "$t\bar{t}$ **differential cross section in lepton+jets channels at ATLAS**" (poster) - ATLAS week at CERN (Geneva, Switzerland), January 2014;

X. M. Franchini – "**Fast Tracker: an ATLAS trigger upgrade project**" - the XCVIII Italian Society of Physics National Congress (2012) in Naples (Italy);

XI. M. Franchini – "**J/ψ polarisation at ATLAS in the di-muon channel**" - the XCVII Italian Society of Physics National Congress (2011) in L'Aquila (Italy);

XII. M. Franchini – "**J/ψ polarisation at ATLAS in the di-muon channel**" (poster) - the INTERNATIONAL SCHOOL OF SUBNUCLEAR PHYSICS 2011 at the E. Majorana center in Erice (Trapani, Italy).

Other Participations at Conferences/Workshops/Schools

- Hadrontherapy school CNAO PRIMES 2017, Pavia (Italy);
- ESC15 - 7th International school on architectures, tools and methodologies for developing efficient large sale scientific computing applications, Bertinoro (Italy);
- TOP 2014 - 7th International Workshop on Top-Quark Physics, Cannes (France);
- ATLAS Higgs workshop 2014, Rome (Italy);
- The ATLAS Hadronic Calibration Workshop 2013, Chicago (Illinois, USA);
- The ATLAS Hadronic Calibration Workshop 2012, Autrans (Grenoble, France);
- The first Hadron Collider School HASCO in 2012, Göttingen (Germany);
- The IV ATLAS Italia Physics Workshop in 2011, Naples (Italy);
- The V ATLAS Italia Physics Workshop in 2010, Sestri Levante (Italy);

DICHIARAZIONI SOSTITUTIVE DI CERTIFICAZIONI

(art. 46 D.P.R. n. 445/00)

DICHIARAZIONI SOSTITUTIVE DELL'ATTO DI NOTORIETA'

(art. 47 D.P.R. n. 445/00)

Il sottoscritto

MATTEO FRANCHINI, codice fiscale FRNMTT86C04A944M,

nato a BOLOGNA (prov. BO) il 4/3/1986, di sesso maschile,

consapevole delle sanzioni penali, nel caso di dichiarazioni non veritiere, di formazione o uso di atti falsi, richiamate dall'art. 76 del D.P.R. 445 del 28 dicembre 2000,

DICHIARA:

- di essere in possesso dei titoli e delle pubblicazioni riportate nell'allegato Curriculum;
- che ogni contenuto relativo a titoli, pubblicazioni e attività svolte riportato nel Curriculum allegato è conforme al vero

Bologna, 03 Novembre 2018