Tommaso Diotalevi

Curriculum Vitae

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Education and training

Nov 2018 – Today **Ph.D. Student in Physics**, *University of Bologna*, Bologna.

Sep 2018 – Oct 2018 **Technological Summer Student fellowship program**, *CNAF*, Bologna.

Jul 2016 – Sep 2016 **CERN Summer Student Programme**, *CERN*, Geneva.
Project report: *"Analysing CMS transfers using Machine Learning techniques"*

Oct 2015 – Jul 2018 **Master Degree in Physics class LM-17**, *University of Bologna*, Bologna, 110/110 cum laude.

Oct 2012 – Oct 2015 **Bachelor Degree in Physics class L-30**, *University of Bologna*, Bologna, 110/110 cum laude.

Sep 2007 – Oct 2012 **Scientific High School Diploma**, *"G.Marconi" Scientific High School*, Pesaro, 96/100.

Academic Teaching

Mar 2019 – May 2019 **Academic Tutor**, *"Software and Computing for Nuclear and Subnuclear Physics" course*, Department of Physics and Astronomy, University of Bologna.

Outreach

28 Sep 2018 **European Night of Researchers**, *Artificial Intelligence for High Energy Physics*, Bologna, Italy.

Master Thesis

Title *CMS Level-1 Trigger Muon Momentum assignment with Machine Learning*

Supervisors Prof. Daniele Bonacorsi, Dott. Carlo Battilana, Dott. Luigi Guiducci

Abstract With the advent of the High-Luminosity phase of the LHC (HL-LHC), the instantaneous luminosity of the Large Hadron Collider at CERN will increase up to $7,5 \cdot 10^{34} cm^{-2} s^{-1}$. Therefore, new algorithmic techniques for data acquisition and processing will be necessary, in preparation for a high pile-up environment that would eventually make the current electronics and trigger devices obsolete. Nowadays, Machine Learning techniques represent a promising alternative to this problem, as they make possible the selection of multiple information - collected by the detector - and build from them different models, able to predict with a certain efficiency fundamental physical quantities, including the transverse momentum p_T. The analysis presented in this Master Thesis consists in the production of such models - with data obtained through Monte Carlo simulations - capable of predicting the transverse momentum of muons crossing the Barrel region of the CMS muon chambers, and compare the results with the p_T assigned by the current CMS Level 1 Barrel Muon Track Finder (BMTF) trigger system.

Bachelor Thesis

Title *Investigation of Petabyte-scale data transfer performances with PhEDEx for the CMS experiment*

Supervisor Prof. Daniele Bonacorsi

Personal skills

Linguistic skills

Italian Mother tongue

English TOEFL iBT (level B2)

- Understanding (listening): C1
- Understanding (reading): B2
- Speaking (Spoken interaction): B2
- Speaking (Spoken production): B2
- Writing: B2

Computer skills

Op. Systems Microsoft Windows, MacOS, Linux

Software Microsoft Office

Languages C++, Python, R, ROOT, LabVIEW, LaTeX

ECDL Qualification obtained on 23/04/2010

Other Skills

Driving licence B

Additional information

Participations

- **INFN School of Statistics 2019**, 2-7 June 2019 (Paestum, Salerno)
- **International Symposium on Grids & Clouds 2019, ISGC2019**, 31 March - 5 April 2019 (Taipei, Taiwan)
- **6th Annual Conference on Large Hadron Collider Physics**, 4-9 June 2018 (Bologna, Italy).
- **2nd BCD International School on High Energy Physics**, 11-15 April 2016 (Corsica, France).

Honours and awards

- First award scholarship in Physics "Fondazione G.Occhialini", achieved on 07/06/2013 (price value: 4000€).

Publications

D. Bonacorsi, T. Diotalevi, N. Magini, A. Sartirana, M. Taze, and T. Wildish. Monitoring data transfer latency in CMS computing operations. *J. Phys. Conf. Ser.*, 664(3):032033, 2015.

Daniele Bonacorsi, V. Kuznetsov, Luca Giommi, T. Diotalevi, J. R. Vlimant, D. Abercrombie, C. Contreras, A. Repecka, Z. Matonis, and K. Kancys. Progress on Machine and Deep Learning applications in CMS Computing. *PoS*, ISGC2018:022, 2018.

Daniele Bonacorsi, Valentin Kuznetsov, Nicolo Magini, Tommaso Diotalevi, Aurimas Repečka,

Žygimantas Matonis, and Kipras Kančls. Progress in Machine Learning Studies for the CMS Computing Infrastructure. *PoS*, ISGC2017:023, 2017.

Diotalevi Tommaso, Daniele Bonacorsi, Carlo Battilana, and Luigi Guiducci. Development of Machine Learning based muon trigger algorithms for the Phase2 upgrade of the CMS . *PoS*, LHCP2018:092, 2018.