

ALLEGATO B

UNIVERSITÀ DEGLI STUDI DI MILANO

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Nello Bruscano CURRICULUM VITAE

INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)

| | |
|------------------------|------------------|
| COGNOME | BRUSCINO |
| NOME | NELLO |
| DATA DI NASCITA | 29, Maggio, 1988 |

Data

14/09/2020

Luogo

ROMA

Nello Bruscano

PHYSICIST · BIG DATA SCIENTIST · NATURE ENTHUSIAST

Via Pitagora 19, Roma, 00162, Italy

☎ (+39) 3481221087 | ✉ nellobruscino@gmail.com | 🌐 nbruscin.web.cern.ch/nbruscin | 🐙 [nbruscin](https://github.com/nbruscin) | 📧 nello.bruscino

Summary

Currently working in the Top and Higgs fields as project leader of the search for the associated production of a single-top-quark and the Higgs boson in the single- and multi-lepton final states and convener of the Top Properties & Mass sub-group within the ATLAS Experiment at CERN, Geneva. My interest lies in applications of A.I. in Particle Physics. Good experience and skills in Machine Learning and Big Data Analysis. Adept to code in C++ and Python and with good python skills in deep learning modules and frameworks like XGBoost, Tensorflow, Keras and Pytorch.

Education

Liceo Classico-Scientifico "E. Torricelli"

Somma Vesuviana (NA), Italy

FINAL GRADE: 100/100

2002 - 2007

Università degli Studi di Napoli Federico II

Naples, Italy

BACHELOR OF SCIENCE IN PHYSICS, 110/110 cum laude

2007 - 2010

- Thesis: "*J/Ψ decay analysis in the dimuon channel at the ATLAS experiment*" [link](#)
- Advisors: Prof. Domenico DELLA VOLPE domenico.della.volpe@cern.ch, Prof. Giovanni CHIEFARI giovanni.chiefari@unina.it

Università degli Studi di Napoli Federico II

Naples, Italy

MASTER OF SCIENCE IN PHYSICS | MAJOR: PARTICLE PHYSICS, 110/110 cum laude

2010 - 2013

- Thesis: "*Measurement of spin-CP properties of the new Higgs-like particle in the $H \rightarrow ZZ^{(*)} \rightarrow 4\ell$ decay channel with the ATLAS detector at LHC*" [link](#)
- Advisors: Prof. Dr. Francesco CONVENTI francesco.conventi@cern.ch, Dr. Elvira ROSSI elvira.rossi@cern.ch, Prof. Giovanni CHIEFARI giovanni.chiefari@unina.it

Physikalisches Institut, Universität Bonn

Bonn, Germany

DOCTOR IN PHYSICS | MAJOR: PARTICLE PHYSICS, MAGNA cum laude

2014 - 2017

- Thesis: "*A gateway to new physics: direct measurement of the top Yukawa coupling to the Higgs boson*" [link](#)
- Supervisors: Dr. Markus CRISTINZIANI markus.cristinziani@cern.ch, Prof. Dr. Norbert WERMES wermes@uni-bonn.de

Work Experience

University of Pittsburgh

Pittsburgh, U.S.A.

POSTDOCTORAL RESEARCHER, BASED AT CERN, GENEVA

May 2017 - July 2019

- Subjects: *Top properties, $t\bar{t}H$ searches and Liquid Argon (LAr) operations in the ATLAS experiment*
- Involved in the search for the SM Higgs boson produced in association with a top quark pair in the multileptonic final states and the precision measurement of the top-quark couplings in the single-top t -channel and $t\bar{t}$.
- From May 2018, coordinator of the Top Background group in the Top group, leader of the team responsible for the harmonization of the fake lepton and W +jets background estimation, by means of dedicated techniques and tools.
- From April 2019, coordinator of the tH group in the Higgs group.
- Engaged in the operation of the LAr calorimeter and Trigger-Data-Acquisition (TDAQ) systems as Software on-call expert and responsible for all aspects of performance and maintenance of the receiver and monitoring system of the calorimeter-based L1 trigger.

INFN Roma 1

Rome, Italy

POSTDOCTORAL RESEARCHER & PRINCIPAL INVESTIGATOR "FELLINI"

July 2019 - Current

- Winner of the Marie Skłodowska-Curie Fellowship 2018 [FELLINI](#) Fellowship for Innovation at INFN, with the project: *Search for tH , exclusion of the inverted-top-coupling hypothesis (ITC) in the ATLAS experiment.*
- Coordinator of the tH group in the ATLAS Higgs group.
- Since April 2020, convener of the Top Properties & Mass sub-group.
- Involved in the differential measurement of the $t\bar{t}W$ cross section at 13 TeV, top polarisation and maintenance of the RPC (Resistive Plate Chambers) sub-system of the ATLAS Muon spectrometer.

Main Publications & Proceedings

"Test of the universality of τ and μ lepton couplings in W -boson decays from $t\bar{t}$ events with the ATLAS detector"

[arXiv:2007.14040 \[hep-ex\]](https://arxiv.org/abs/2007.14040)

G. Aad et al. [ATLAS],

Submitted to Nature Physics

- <http://old.inspirehep.net/record/1809056>
- 3 citations counted in INSPIRE as of 15 Sep 2020

“Evidence for $t\bar{t}t\bar{t}$ production in the multilepton final state in proton-proton collisions at $\sqrt{s}=13$ TeV with the ATLAS detector”

G. Aad *et al.* [ATLAS],

- <http://old.inspirehep.net/record/1809244>

“Combination of the W boson polarization measurements in top quark decays using ATLAS and CMS data at $\sqrt{s} = 8$ TeV”

G. Aad *et al.* [ATLAS],

- [arXiv:2005.03799](https://arxiv.org/abs/2005.03799) [hep-ex].
- 2 citations counted in INSPIRE as of 15 Sep 2020

“Observation of the associated production of a top quark and a Z boson in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”

G. Aad *et al.* [ATLAS],

- [arXiv:2002.07546](https://arxiv.org/abs/2002.07546) [hep-ex].
- 1 citations counted in INSPIRE as of 13 May 2020

“Search for flavour-changing neutral currents in processes with one top quark and a photon using 81 fb^{-1} of pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS experiment”

G. Aad *et al.* [ATLAS],

- [arXiv:1908.08461](https://arxiv.org/abs/1908.08461) [hep-ex].
- 5 citations counted in INSPIRE as of 13 May 2020

“Combinations of single-top-quark production cross-section measurements and $|f_{LV}V_{tb}|$ determinations at $\sqrt{s} = 7$ and 8 TeV with the ATLAS and CMS experiments”

M. AABOUD *et al.* [ATLAS AND CMS],

- [arXiv:1902.07158](https://arxiv.org/abs/1902.07158) [hep-ex].
- 13 citations counted in INSPIRE as of 13 May 2020

“Observation of Higgs boson production in association with a top quark pair at the LHC with the ATLAS detector”

M. AABOUD *et al.* [ATLAS COLLABORATION],

- [arXiv:1806.00425](https://arxiv.org/abs/1806.00425) [hep-ex]
- 245 citations counted in INSPIRE as of 13 May 2020

“Evidence for the associated production of the Higgs boson and a top quark pair with the ATLAS detector”

M. AABOUD *et al.* [ATLAS COLLABORATION],

- [arXiv:1712.08891](https://arxiv.org/abs/1712.08891) [hep-ex]
- 110 citations counted in INSPIRE as of 13 May 2020

“Search for the Standard Model Higgs boson decaying into $b\bar{b}$ produced in association with top quarks decaying hadronically in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector”

G. Aad *et al.* [ATLAS COLLABORATION],

- [arXiv:1604.03812](https://arxiv.org/abs/1604.03812) [hep-ex]
- 67 citations counted in INSPIRE as of 13 May 2020

“Measurements of the Higgs boson production and decay rates and constraints on its couplings from a combined ATLAS and CMS analysis of the LHC pp collision data at $\sqrt{s} = 7$ and 8 TeV”

G. Aad *et al.* [ATLAS AND CMS COLLABORATIONS],

- [arXiv:1606.02266](https://arxiv.org/abs/1606.02266) [hep-ex]
- 1240 citations counted in INSPIRE as of 13 May 2020

“Performance of the ATLAS Trigger System in 2015”

M. AABOUD *et al.* [ATLAS COLLABORATION],

- [arXiv:1611.09661](https://arxiv.org/abs/1611.09661) [hep-ex]
- 539 citations counted in INSPIRE as of 13 May 2020

“Constraints on new phenomena via Higgs boson couplings and invisible decays with the ATLAS detector”

G. Aad *et al.* [ATLAS COLLABORATION],

- [arXiv:1509.00672](https://arxiv.org/abs/1509.00672) [hep-ex]
- 308 citations counted in INSPIRE as of 13 May 2020

[arXiv:2007.14858](https://arxiv.org/abs/2007.14858) [hep-ex]

Submitted to European Physics Journal
(EPJC)

[JHEP **2008**, no. 08, 051 \(2020\)](#)

[doi:10.1007/JHEP08\(2020\)051](https://doi.org/10.1007/JHEP08(2020)051)

[JHEP **07** \(2020\), 124](#)

[doi:10.1007/JHEP07\(2020\)124](https://doi.org/10.1007/JHEP07(2020)124)

[Phys. Lett. B **800** \(2020\), 135082](#)

[doi:10.1016/j.physletb.2019.135082](https://doi.org/10.1016/j.physletb.2019.135082)

[JHEP **05** \(2019\), 088](#)

[doi:10.1007/JHEP05\(2019\)088](https://doi.org/10.1007/JHEP05(2019)088)

[Phys. Lett. B **784**, 173 \(2018\)](#)

[DOI:10.1016/j.physletb.2018.07.035](https://doi.org/10.1016/j.physletb.2018.07.035)

[Phys. Rev. D **97**, no. 7, 072003 \(2018\)](#)

[DOI:10.1103/PhysRevD.97.072003](https://doi.org/10.1103/PhysRevD.97.072003)

[JHEP **1605**, 160 \(2016\)](#)

[DOI:10.1007/JHEP05\(2016\)160](https://doi.org/10.1007/JHEP05(2016)160)

[JHEP **1608**, 045 \(2016\)](#)

[DOI:10.1007/JHEP08\(2016\)045](https://doi.org/10.1007/JHEP08(2016)045)

[Eur. Phys. J. C **77**, no. 5, 317 \(2017\)](#)

[DOI:10.1140/epjc/s10052-017-4852-3](https://doi.org/10.1140/epjc/s10052-017-4852-3)

[JHEP **1511**, 206 \(2015\)](#)

[DOI:10.1007/JHEP11\(2015\)206](https://doi.org/10.1007/JHEP11(2015)206)

“Study of the spin and parity of the Higgs boson in diboson decays with the ATLAS detector”

G. Aad *et al.* [ATLAS COLLABORATION].

- Erratum: [Eur. Phys. J. C **76**, no. 3, 152 (2016)]
- DOI:10.1140/epjc/s10052-016-3934-y
- arXiv:1506.05669 [hep-ex]
- 297 citations counted in INSPIRE as of 13 May 2020

[Eur. Phys. J. C **75**, no. 10, 476 \(2015\)](#)

[DOI:10.1140/epjc/s10052-015-3685-1](#)

“Search for Higgs boson pair production in the $b\bar{b}b\bar{b}$ final state from pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector”

G. Aad *et al.* [ATLAS COLLABORATION].

- arXiv:1506.00285 [hep-ex]
- 139 citations counted in INSPIRE as of 13 May 2020

[Eur. Phys. J. C **75**, no. 9, 412 \(2015\)](#)

[DOI:10.1140/epjc/s10052-015-3628-x](#)

“Search for flavour-changing neutral current top quark decays $t \rightarrow Hq$ in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector”

G. Aad *et al.* [ATLAS COLLABORATION].

- arXiv:1509.06047 [hep-ex]
- 93 citations counted in INSPIRE as of 13 May 2020

[JHEP **1512**, 061 \(2015\)](#)

[DOI:10.1007/JHEP12\(2015\)061](#)

“Measurements of b -jet tagging efficiency with the ATLAS detector using $t\bar{t}$ events at $\sqrt{s} = 13$ TeV”

M. Aaboud *et al.* [ATLAS COLLABORATION].

- [INSPIRE-HEP entry](#)
- 146 citations counted in INSPIRE as of 13 May 2020

[arXiv:1805.01845 \[hep-ex\]](#)

[CERN-EP-2018-047](#)

“Direct measurements of V_{tb} and constraints on the Wtb anomalous couplings at the LHC”

NELLO BRUSCINO

- published online by Zenodo
- [10.5281/zenodo.2536233](#)

[Proceeding for CKM 2018](#)

“Measurement of the Higgs boson mass in the $H \rightarrow ZZ^{(*)} \rightarrow 4\ell$ and $H \rightarrow \gamma\gamma$ channels with $\sqrt{s} = 13$ TeV pp collisions using the ATLAS detector”

NELLO BRUSCINO

- published online by International Journal of Modern Physics: Conference Series
- [10.1142/S2010194518600522](#).

[Proceeding for PANIC 2017,](#)

“Search for the Standard Model Higgs boson decaying into $b\bar{b}$ produced in association with hadronically decaying top quarks in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector”

NELLO BRUSCINO

- Proceeding for LHCP 2016, edited by Proceeding of Science (PoS)
- [PoS\(LHCP2016\)192](#).

[PoS\(LHCP2016\)192](#)

“Measurement of the Higgs-like boson mass in the $ZZ^{(*)} \rightarrow 4\ell$ decay channel with the ATLAS detector”

NELLO BRUSCINO

- Proceeding for IFAE 2013, Incontri di Fisica delle Alte Energie, edited by Società Italiana di Fisica (SIF)
- [10.1393/ncc/i2014-11705-7](#).

[IFAE 2013 - Vol. 37, N. 1, 2014, pp. 272-274](#)

Invitation to Conferences, Workshops & Schools

8th International Conference on New Frontiers in Physics (ICNFP 2019)

INVITED SPEAKER

- Plenary talk: “Top quark physics with the ATLAS detector: recent highlights” [PDF](#)

[Kolymbari, Crete, Greece](#)

[Aug. 2019](#)

10th International Workshop on the CKM Unitary Triangle (CKM 2018)

INVITED SPEAKER

- Talk: “Direct measurements of V_{tb} and constraints on the Wtb anomalous couplings at the LHC” [PDF](#)

[Heidelberg, Germany](#)

[Sep. 2018](#)

21st Particles & Nuclei International Conference 2017 (PANIC 2017)

INVITED SPEAKER

- Talk: “Measurement of the Higgs boson mass in the $H \rightarrow ZZ^{(*)} \rightarrow 4\ell$ and $H \rightarrow \gamma\gamma$ channels with $\sqrt{s} = 13$ TeV pp collisions using the ATLAS detector” [PDF](#)

[Beijing, China](#)

[Sep. 2017](#)

ATLAS-D Physics Meeting

SPEAKER

- Talk: “On the way to measure the top Yukawa coupling: search for the $t\bar{t}H$ process in multileptonic final states at 13 TeV in ATLAS” [PDF](#)

[Heidelberg, Germany](#)

[Oct. 2016](#)

4th Annual Large Hadron Collider Physics Conference (LHCP2016)

Lund, Sweden

PRESENTER

Jun. 2016

- Poster: "Search for the $t\bar{t}H$ vertex via fully hadronic final state, based on "Search for the Standard Model Higgs boson decaying into $b\bar{b}$ produced in association with top quarks decaying hadronically in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector"

[ATL-PHYS-SLIDE-2016-319](#)

DPG 2016, Deutsche Physikalische Gesellschaft

Hamburg, Germany

PRESENTER

Mar. 2016

- Talk: "Search for the production of the Higgs boson in association with a pair of top quarks in the 3 leptons final state at 13 TeV in ATLAS"

[Abstract](#)

DPG 2015, Deutsche Physikalische Gesellschaft

Wuppertal, Germany

PRESENTER

Mar. 2015

- Talk: "Search for the decay $H \rightarrow b\bar{b}$ in association with a pair of hadronically decaying top quarks at 8 TeV in ATLAS"

[Abstract](#)

SIF 2013, Società Italiana di Fisica

Trieste, Italy

PRESENTER

Sep. 2013

- Talk: "Hypothesis test on different Spin-CP states of the new resonance in the $H \rightarrow ZZ^{(*)} \rightarrow 4\ell$ channel decay in ATLAS"

[PDF](#)

IFAE 2013, Incontri di Fisica delle Alte Energie

Cagliari, Italy

PRESENTER

Apr. 2013

- Poster: "Measurement of the Higgs-like boson mass in the $ZZ^{(*)} \rightarrow 4\ell$ decay channel with the ATLAS detector"

Membership of Scientific Societies

| | | |
|--------------|---|---------------|
| 2020 - | Marie Curie Alumni Association (MCAA) | International |
| 2019 - | Società Italiana di Fisica (SIF) | Italy |
| 2013 - 2017, | Deutsche Physikalische Gesellschaft (DPG) | Germany |
| 2007 - 2013, | Società Italiana di Fisica (SIF) | Italy |

Honors, Awards & Certificates

| | | |
|-------------|--|------------------------|
| 2019 - 2022 | Winner of FELLINI Fellowship , Marie Curie Fellowship 2018 (FELLINI - Fellowship for Innovation at INFN), Fellowship value: 150 k€+ 54 k€(personal funds) | EU & INFN, Italy |
| 2018 | Award , honorary plaque by Mayor of Somma Vesuviana, as citizen for the relevant contributions in the field of Particle Physics | Somma Vesuviana, Italy |
| 2014 | Certificate , TOEFL®: 97/120, Internet-based Test (TOEFL IBT™), reading:29, listening:24, speaking:22, writing:22 | Bonn, Germany |
| 2008 - 2011 | 4 Borse di Studio Adisu , scholarships for excellent academic results, Overall Scholarships value: ~ 8 k€ | Naples, Italy |

Outreach activities

| | | |
|--------|--|---------------------|
| 2020 - | Presenter , outreach activities for students as part of high-energy physics masterclass day | Rome, Italy |
| 2019 - | Volunteer , CERN Open Days | Geneva, Switzerland |
| 2016 - | CERN official guide , guided visits (private groups, students and open visits) for several CERN tours | Geneva, Switzerland |
| 2016 - | ATLAS Underground guide , ATLAS Experimenti at CERN | Geneva, Switzerland |

Languages

| | |
|----------------|---|
| ITALIAN | Mother tongue |
| ENGLISH | Fluent speaking, reading and writing |
| FRENCH | Competent speaking, reading and writing |
| GERMAN | Basic Knowledge |

Supervisory Experience

Since May 2017, I have been involved in the supervision of 3 graduate students at CERN, from the University of Pittsburgh. For 3 months I have supervised the work of a Master student from Università di Roma "La Sapienza", funded by the INFN (Istituto Nazionale di Fisica Nucleare) project 2017. In 2020 I have supervised the work of 2 Master students from Università di Roma "La Sapienza" for a class project.

SUPERVISOR

Università di Roma "La Sapienza"

Rome, Italy

SARA CELANI, MASTER OF SCIENCE IN PHYSICS | MAJOR: PARTICLE PHYSICS

2018

- Thesis: "**A Multivariate Analysis in the Higgs production in association with a top quark pair for the multileptonic final state with two same sign light leptons plus one hadronically decaying τ with the ATLAS detector**" [link](#)
- Additional advisor: Prof. Simonetta GENTILE simonetta.gentile@uniroma1.it

Educational and organizational experiences

ATLAS Top Workshop 2020

CHAIR OF THE TOP PROPERTIES & MASS SESSION

- [Workshop](#)

Online

May. 2020

7th ATLAS Single-top Workshop 2018

CHAIR OF THE BACKGROUND SESSION. , (JULY 2018,

- [Workshop](#)

Braga, Portugal

Dec. 2018

US-ATLAS Workshop 2018

MEMBER OF ORGANISING COMMITTEE

- Total number of participants: 70
- [Workshop](#)

Pittsburgh, U.S.A.

Jul. 2020

CERN, ATLAS

REVIEWER FOR ATLAS COLLABORATION

Geneva, Switzerland

2015 - Current

Physikalisches Institut, Universität Bonn

TUTOR & EXERCISE TEACHER

- I have been regularly involved in tutoring (i.e., teaching of presence exercises) for university courses.
- I delivered, on average, 20 hours of tutoring per year.

Bonn, Germany

2014 - 2017

COURSES

2016 **Intensive week: lectures & programming tutorials in Particle Physics**, Physikalisches Institut, Universität Bonn

Bonn, Germany

2014 - 2015 **Particle Collider Physics**, Physikalisches Institut, Universität Bonn

Bonn, Germany

Skills

Basic Knowledge FORTRAN

Good Knowledge Object oriented programming (OOP), HTML, Grid application: PATHENA and PANDA

Excellent Knowledge C, C++ programming languages, BASH shell scripting, \LaTeX , PYTHON, Multivariate analysis techniques (TMVA, XGBoost, Tensorflow ...)

Interests & Activities

- Higgs boson properties and Standard Model Higgs boson searches, top-quark state-of-the-art physics, beyond the Standard Model searches involving Higgs and top particles,
- accelerator physics, data analysis with advanced statistical tools, multivariate techniques for data analysis (Decision Tree, Neural Network, ...),
- object oriented programming (OOP) and grid computing.