

Curriculum vitae

1 Personal details

Name Prof. Nicola Giacinto Piacquadio
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2 Professional history

2016-present Assistant Professor at Stony Brook University (State University of New York)
2015-2016 SLAC Staff Scientist (continuing appointment)
2012-2015 SLAC Panofsky Fellow
2009-2012 CERN Research Fellow

3 Education

2005-2010 **Ph.D. degree:** Faculty of Physics, University of Freiburg (Germany)
Graduation on 01. February 2010 with final grade “Summa cum laude”
Thesis: *“Identification of b -jets and investigation of the discovery potential of a Higgs boson in the $WH \rightarrow l\bar{b}b\bar{b}$ channel with the ATLAS experiment”*
Advisor: Prof. Karl Jakobs, Freiburg University
2000-2005 **Master degree:** Faculty of Physics, “La Sapienza University” in Rome (Italy)
Graduation on 14 July 2005 with final grade 110/110 cum laude
Thesis: *“ B meson decays into three light pseudoscalars”*
Advisor: Prof. Fernando Ferroni, Rome University
1995-2000 High school: Ginnasio “V. Lanza” in Foggia (Italy)
Graduated with final mark 100/100

4 Scientific leadership

Oct 2018-Sep 2020 Convener of the ATLAS Higgs Working group (>400 members)
Oct 2014-Sep 2016 Convener of the ATLAS flavor-tagging group (~80 members)
Oct 2013-Sep 2014 Convener of $H \rightarrow b\bar{b}$ subgroup of ATLAS Higgs Working group (~60 members)
Oct 2012-Sep 2013 Contact person for b -tagging in the Higgs Working Group
2011-2013 ATLAS coordinator of the VH sub-group of the Higgs cross section WG
2010-2011 Convener of the ATLAS Pixel Clusterization Task Force (12 members)
2008-2011 Responsible for the ATLAS primary and secondary vertex reconstruction software

5 Awards

- W. Panofsky Fellowship (2012)
- CERN Research Fellowship and Marie Curie Award (2009)
- Scholarship from University of Rome (2004, as 2nd-best ranked physics student of the year)

6 Grants

- NSF base grant “Measurement of the Higgs Sector Through Decays to b -quarks” (2018-2020)

7 Research and professional experience

Main contributions to the ATLAS physics program

- Physics studies and measurements
 - Run-2 $H \rightarrow b\bar{b}$ analysis based on 2015-2017 data leading to first observation of $H \rightarrow b\bar{b}$ decays in Summer 2018 (optimization of $WH \rightarrow l\nu b\bar{b}$ channel and signal and background modelling studies)
 - Run-2 $H \rightarrow b\bar{b}$ analysis based on 2015+2016 data (contact editor for the 2017 $H \rightarrow b\bar{b}$ Evidence paper and responsible for the multi-jet estimate in the WH channel)
 - Search for the Higgs boson in the $WH \rightarrow l\nu b\bar{b}$ channel (from 2011 up to the full Run-I analysis)
 - Measurement of cross section for $W + b$ production based on 2010 data
 - Supporting vertex studies for the measurement of cross section of minimum bias events
 - Re-evaluation of the ATLAS discovery potential for $H \rightarrow b\bar{b}$ in the $WH \rightarrow l\nu b\bar{b}$ channel (2008)
- Identification of b -quark jets
 - First measurement of c -jet tagging efficiency in $t\bar{t}$ events (2017, based on 2015+2016 data)
 - Optimization and commissioning of the b -tagging algorithms and software for Run-2
 - Development of a calibration procedure to simultaneously use several b -tagging working points
 - Measurement of b -tagging efficiency in $t\bar{t}$ events with unprecedented precision using novel combinatorial likelihood method
 - Commissioning of track reconstruction for b -tagging (2010) and later of the more advanced algorithms, including JetFitter (2011), with data
 - Development of a novel secondary vertex based algorithm (JetFitter), designed to inclusively fit the $b \rightarrow c$ -hadron decay chains expected in b -quark jets and application to b -jet identification
- Studies involving the Inner Tracking detector
 - Vertex reconstruction and b -tagging studies for the Insertable B-Layer (IBL) TDR
 - Design, implementation, commissioning of Neural Network based clustering algorithm
 - Participation in planar pixel sensor beam test activities
 - b -tagging studies for the Phase-II upgrade of the Inner Tracker (ITK) (contributing to the 2nd ECFA workshop, to the scoping document and to the large η task-force report)
- Primary vertex reconstruction
 - Development of the ATLAS primary vertex reconstruction framework and implementation of several vertex finding and fitting strategies
 - Commissioning of tracking and vertex reconstruction with Run-I data
- Determination of the absolute luminosity using beam separation scans
 - Main analyser of the measurement based on tracking-based offline luminosity counters
 - Responsible for the beam separation length scale calibration analysis
 - Design of a 3d unbinned likelihood fit to the luminous region which combines rate and vertex information during beam separation scans, extending the original Van der Meer formalism

7.1 Member of the following editorial boards (ATLAS review committees)

- Search for $ttH, H \rightarrow b\bar{b}$ based on 2015+2016 Run-2 data (which led to ttH evidence in 2017)
- Search for di-Higgs production in the $bb\tau\tau$ channel based on 2015+2016 Run-2 data
- Search for the decay $B_s \rightarrow \mu^+\mu^-$ with the ATLAS detector (partial 2011 dataset)
- Search for the rare decays $B_s^0 \rightarrow \mu\mu$ at the LHC with the ATLAS, CMS and LHCb experiments
- Limit on $B_s^0 \rightarrow \mu\mu$ branching fraction based on 4.9 fb^{-1} of integrated luminosity
- Measurement of the production cross-sections of at least one and at least two b -jets in association with a Z boson in proton-proton collisions at 7 TeV with the ATLAS detector (JHEP10(2014)141)

7.2 Research experience before joining ATLAS experiment

- Diploma thesis, University of Rome (September 2004 - July 2005)
“**B meson decays into three light pseudoscalars**”
 - Experimental side: Study of time dependent CP asymmetry between B^0 and \bar{B}^0 mesons decaying into $K_S K_S K_S$ at the BaBar experiment (presented at the EPS conference in July 2005)
 - Theoretical side: Development of a general parametrization for three body non-leptonic B decays, using the NLO effective Hamiltonian formalism. One-month collaboration in Munich with the group of Prof. A. Buras (through scholarship).

8 Talks and seminars

8.1 Main Talks at conferences

- Summary talk on Higgs boson measurements from ATLAS and CMS, including announcement of first observation of $H \rightarrow b\bar{b}$ decays (ICHEP 2018, South Korea)
- Higgs Boson fermionic production and decay modes with ATLAS (Pheno 2018, Pittsburgh)
- VBF measurements from ATLAS (Higgs plus dijets at the LHC 2018, Durham)
- Properties of the Higgs Boson (DPF Meeting 2017 of APS, Fermilab, Chicago)
- Run-I ATLAS Higgs results and perspectives for Run-II (Moriond EW, 2015, La Thuile)
- Measuring the Higgs coupling to b-quarks (Higgs days 2014, Santander)
- Flavor tagging and identification (The flavor of Higgs, 2014, Weizmann, Israel)
- Search for the Standard Model Higgs boson produced in association with a vector boson and decaying to a b-quark pair with the ATLAS detector at the LHC (ICHEP 2012)
- ATLAS Tracking, Alignment and Silicon Detector Performance (Vertex 2010)
- B-Tagging in ATLAS: Expected Performance and Calibration with Data (Charged Higgs 2008)

8.2 Seminars and Colloquia

- Evidence for the Higgs to bb decay with the ATLAS detector, UMass (Amherst), 03/23/2018
- **LHC Seminar:** Evidence for the H to bb decay in VH production with the ATLAS detector, CERN (Geneva), 07/25/2017
- What bottom quarks can tell us about the Higgs sector, Southern Methodist University (Dallas), 03/02/2017
- Stony Brook Colloquium: What bottom quarks can tell us about the Higgs sector, 10/25/2016
- Constraining new physics in the Higgs sector through decays to b -quarks, Stony Brook, 11/12/2015
- Probing the Higgs sector with b -quark jets, SLAC Experimental Seminar, 8/4/2015

- Searching for H to bb decays with the ATLAS detector at LHC, Bonn University, 12/19/2013
- Recent progress in Higgs studies at ATLAS and CMS, SLAC Experimental Seminar, 04/30/2013
- Searching for $H \rightarrow bb$ decays with the ATLAS detector, SLAC Experimental Seminar, 04/19/2012
- Optimization of the b-jet identification in ATLAS, Wuppertal University, 02/08/2012
- Higgs searches using fat jets, GGI Firenze, 10/07/2009

8.3 Other talks

- Over 25 talks at ATLAS workshops (including Higgs, b -tagging and tracking) or plenary ATLAS meetings
- Over 900 talks or contributions to internal ATLAS meetings

9 Review articles

- Author of the $H \rightarrow b\bar{b}$ chapter of the review book “Discovery of the Higgs Boson”, World Scientific (2016)

10 Conference/workshop organization

- Joint $H \rightarrow b\bar{b}$ /Flavor Tagging Workshop (Stony Brook, 2017)
- Machine Learning/ b -tagging workshop (SLAC, 2017)
- Higgs Couplings Conference (SLAC, 2016)
- $H \rightarrow b\bar{b}$ Workshop (UCL, 2016)
- Flavor Tagging Workshop (Bonn University, 2016)
- Flavor Tagging Workshop (CERN, 2015)

11 Teaching experience

- Fall 2018 (Stony Brook): Modern Physics (undergraduate)
- Spring 2018 (Stony Brook): Elementary Particle Physics (graduate)
- Fall 2017 (Stony Brook): Modern Physics (undergraduate)
- Spring 2017 (Stony Brook): Elementary Particle Physics (graduate)
- Fall 2016 (Stony Brook): Connections in Science (undergraduate)
- Teaching assistant in several university courses (Freiburg), “Mathematical methods for physics” and “Experimental physics: Mechanics and Electrodynamics ” (2006-2009)

12 Mentoring experience

- Supervision of Yan Ke (2018, PhD student, Stony Brook)
- Supervision of Jinzeng Li (2018, undergraduate research project, Stony Brook)
- Supervision of Thomas Calvet (2018, post-doc, Stony Brook)
- Supervision of Yu Pan (2018, undergraduate research project, Stony Brook)
- Supervision of Peiran Li (2018, undergraduate research project, Stony Brook)
- Supervision of Yiting Wang (2017-2018, undergraduate research project, Stony Brook)
- Supervision of Valerio Dao (2016-2017, post-doc, Stony Brook, now Research Fellow at CERN)
- Supervision of Sijun Xu (2016, undergraduate research project, Stony Brook)
- Supervision of Xiadong Li (2016, master research project, Stony Brook)
- Co-supervision of Caitlin Malone, PhD student in the SLAC group (2013-2015)

- Supervision of Matthew Solt, PhD student from Stanford for a Summer rotation project (2014)
- Supervision of Przemyslaw Banka and Christine Rasmussen, CERN summer students (summer 2010, summer 2011)
- Co-supervision of Johanna Bronner, master student in the Freiburg group (2008-2009)