Giacinto Piacquadio - Curriculum Vitae

Personal details

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Professional history

from 9/2024	Professor at Stony Brook University
2023-2024	Visiting Scientist at Max-Planck-Institut for Physics (Munich)
2019-2024	Associate Professor at Stony Brook University
2019	CERN Scientific Associateship
2016-2019	Assistant Professor at Stony Brook University
2015-2016	SLAC Staff Scientist (continuing appointment)
2012-2015	SLAC Panofsky Fellow
2009-2012	CERN Research Fellow

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 $\rightarrow \ell\nu b\bar{b}$ CHANNEL WITH THE ATLAS EXPERIMENT"
	Advisors: Prof. Karl Jakobs, Dr. Christian Weiser, final grade "Summa cum laude"
2000-2005	**Master's 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"
	Advisors: Prof. Fernando Ferroni, Dr. Luca Silvestrini
1995-2000	High school: Ginnasio "V. Lanza" in Foggia (Italy)
	Graduated with final mark 100/100

Scientific leadership

2020-2022	ATLAS Steering Committee Member of the LHC Higgs Working Group
2018-2020	Co-convener of the ATLAS Higgs Working group (>400 members)
2014-2016	Co-convener of the ATLAS Flavor Tagging group (∼80 members)
2013-2014	Co-convener of $H \rightarrow b\bar{b}$ subgroup of ATLAS Higgs Working group (∼60 members)
2012-2013	Contact person for b-tagging in the Higgs Working Group
2011-2013	ATLAS coordinator of the VH sub-group of the LHC Higgs WG
2010-2011	Co-convener of the ATLAS Pixel Clusterization Task Force (12 members)
2008-2011	Co-responsible for the primary and secondary vertex reconstruction software

Recognitions & Awards

- CERN Scientific Associateship (2019)
- Promoted to Associate Professor at Stony Brook with early tenure (2019)
- Winner of the Italian Rita Levi Montalcini Excellence Program (2016)
- Wolfgang Panofsky Fellowship at SLAC (2012)

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

Grants

- NSF base group grant "Experimental Studies of the Higgs Mechanism in the Standard Model and Beyond" (co-PI with 2 other PIs, 2023-2026)
- NSF base group grant "Experimental Studies of the Higgs Mechanism in the Standard Model and Beyond" (co-PI with 2 other PIs, 2020-2023)
- NSF base grant "Measurement of the Higgs Sector Through Decays to b-quarks" (single PI, 2018-2020)

Research and professional experience

Main contributions to ATLAS experiment
- Physics measurements
    - $HH \to bb\tau\tau$: overall review and contributions to full Run-2 and Run-3 analyses (2021-ongoing)
    - $H \to \tau\tau$ analysis: 'precision' measurement of coupling to tau-leptons (2021)
    - $VH, H \to b\bar{b}$ analysis: from feasibility studies (2010) to observation (2018), to 'precision' measurements (2021-ongoing)
    - Run-1 and Run-2 Higgs boson combinations
    - Measurement of cross section for $W + b$ production (Run-1)
    - Measurement of cross section of minimum bias events with first Run-1 data
- Inner Tracking detector
    - Preparation of assembly and pre-production of L1 Modules for the Pixel Detector for HL-LHC
    - Early development of Pixel modules readout through the FELIX architecture
    - Vertex reconstruction and b-tagging studies for the IBL TDR
    - Design, implementation, commissioning of Neural Network based clustering algorithm
    - Development and commissioning of the primary vertex reconstruction framework
- Identification of b-quark jets
    - Definition and calibration of boosted $X \to b\bar{b}$ taggers
    - Calibration of full Run-2 c-tagging algorithm
    - Several novel measurements for the b-, c and light-jet tagging efficiencies
    - Proposal and implementation of pseudo-continous b-tagging
    - Optimization and commissioning of the b-tagging algorithms in Run-1 and in Run-2
    - Design and implementation of JetFitter, our standard b-to c-hadron decay-chain fitter
- Identification of τ-leptons
    - Preparation of algorithms and calibrations for Run-3 data taking
    - Calibration of τ-substructure for measurement of CP nature of Higgs coupling to τ leptons
- Determination of the absolute luminosity using beam separation scans (Run-1)
    - Offline luminosity determination, and beam separation length scale calibration
    - Design of 4d unbinned likelihood fit (led to finding 'non-factorization effects')

Review activity
- Reviewer for Nuclear Instrumentation and Methods in Physics Research Journal (NIM A), since 2022
- Reviewer for Journal of High Energy Physics (JHEP), since 2021
- ATLAS Spokesperson delegate sign-off for 6 publications, since 2020
- Reviewer for NSF (US National Science Foundation) grant proposals, since 2018

- Member of 8 ATLAS Editorial Boards, 1 as Chair, since 2014 (see below)

Member of the following Editorial Boards (ATLAS review committees)

- Application of optimal transport techniques to b-tagging calibration (EB Chair, 2024)
- Search for di-Higgs production in the $bb\tau\tau$ with full Run-2 data (EB Chair, 2021-2022)
- Search for $ttH, H \to b\bar{b}$ 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 $B_s \to \mu^+\mu^-$ with the ATLAS detector (partial 2011 dataset)
- Search for the rare decays $B_s^0 \to \mu\mu$ at the LHC with the ATLAS, CMS and LHCb experiments
- Limit on $B_s^0 \to \mu\mu$ 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)

Talks and seminars

Main Talks at conferences

- Effective Field Theory Results from Higgs and beyond (Higgs conference 2022, Pisa)
- *Experimental Summary Talk* (concluding Higgs Hunting 2022 conference, Paris)
- Summary talk on Higgs boson measurements from ATLAS and CMS, including announcement of first observation of $H \to b\bar{b}$ 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 prospectives 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)

Seminars and Colloquia

- DESY Colloquium: Beauty (quarks) and the Higgs as a Window into New Physics, Oct 2023
- Public Talk on the Higgs Boson in Worlds of Physics (Stony Brook, Apr 2023)
- Stony Brook Colloquium: Beauty (quarks) and the Higgs as Window into New Physics at the LHC, Nov 2022
- Higgs Boson Decays to b-Quarks as Window into New Physics at the LHC, Pittsburgh, Mar 2021
- Innsbruck Colloquium: Beauty (quarks) and the Higgs as Window into New Physics, Feb 2021
- Evidence for the Higgs to bb decay with the ATLAS detector, UMass (Amherst), Mar 2018
- *LHC Seminar*: Evidence for the H to bb decay in VH production with the ATLAS detector, CERN (Geneva), Jul 2017
- What bottom quarks can tell us about the Higgs sector, Southern Methodist University (Dallas), Feb 2017
- Stony Brook Colloquium: What bottom quarks can tell us about the Higgs sector, Oct 2016
- Constraining new physics in the Higgs sector through decays to b-quarks, Stony Brook, Nov 2015
- Probing the Higgs sector with b-quark jets, SLAC Experimental Seminar, Apr 2015
- Searching for H to bb decays with the ATLAS detector at LHC, Bonn University, Dec 2013
- Recent progress in Higgs studies at ATLAS and CMS, SLAC Experimental Seminar, Apr 2013

- Searching for H → bb decays with the ATLAS detector, SLAC Experimental Seminar, Apr 2012
- Optimization of the b-jet identification in ATLAS, Wuppertal University, Feb 2012
- Higgs searches using fat jets, GGI Firenze, Jul 2009

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

Review articles

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

Conference/workshop organization

- Higgs conference 2023, Co-Chair of International Organizing Committee (Beijing, China)
- Higgs conference 2022, Co-Chair of International Organizing Committee (Pisa, Italy)
- Higgs conference 2021, LOC chair (Stony Brook/Simons Center/BNL, virtual due to COVID-19)
- Higgs conference 2020, LOC member (Stony Brook/Simons Center/BNL, virtual due to COVID-19)
- Joint $H \to b\bar{b}$/Flavor Tagging Workshop (Stony Brook/Simons Center, 2017)
- Machine Learning/b-tagging workshop (SLAC, 2017)
- Higgs Couplings Conference (SLAC, 2016)
- $H \to b\bar{b}$ Workshop (UCL, 2016)
- Flavor Tagging Workshop (Bonn University, 2016)
- Flavor Tagging Workshop (CERN, 2015)

Teaching (main courses)

- Fall 2023-Spring 2024: Visiting position at MPI Munich (Sabbatical)
- Spring 2023 (Stony Brook): Physics for Life Science II (undergraduate)
- Fall 2022 (Stony Brook): Physics for Life Science I (undergraduate)
- Spring 2022 (Stony Brook): Elementary Particle Physics (graduate)
- Fall 2021 (Stony Brook): Classical Physics A (undergraduate)
- Spring 2021 (Stony Brook): Elementary Particle Physics (graduate)
- Fall 2020 (Stony Brook): Classical Physics I recitations (undergraduate)
- Fall 2019-Spring 2020: Teaching Buyout paid by NSF (Higgs convenership at CERN)
- 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)

Mentoring/supervision

- Martino Tanasini (2024, post-doc, Stony Brook)

- Storm Lin (2023-ongoing, PhD student)
- Neal Anderson (2022-ongoing, PhD student, Stony Brook)
- Storm Lin (2021-2023, Master's student, graduated in Spring 2023)
- Jeffrey Backus (Summer 2021, REU Student, Stony Brook)
- Spencer Tamagni (Summer 2021, REU Student, Stony Brook)
- Ilaria Luise (2020-2022, post-doc, Stony Brook, now CERN Fellow doing Climate Science)
- Quentin Buat (2020-2021, senior post-doc, Stony Brook, now junior faculty in UW Seattle)
- Noah Devane (Summer 2020, REU student, Stony Brook)
- Yan Ke (2018-2023, PhD student, Stony Brook, graduation expected in Summer 2023)
- Jinzeng Li (2018-2019, undergraduate research project, Stony Brook)
- Thomas Calvet (2018-2020, post-doc, Stony Brook, now data manager at Airbus)
- Yu Pan (2018, undergradute research project, Stony Brook)
- Peiran Li (2018, undergradute research project, Stony Brook)
- Yiting Wang (2017-2018, undergradute research project, Stony Brook)
- Valerio Dao (2016-2017, post-doc, Stony Brook, now LD Staff member at CERN)
- Sijun Xu (2016, undergradute research project, Stony Brook)
- Xiadong Li (2016, master research project, Stony Brook)
- Caitlin Malone, PhD student co-supervised in the SLAC group (2013-2015)
- Matthew Solt, PhD student from Stanford for a Summer rotation project (2014)
- Przemyslaw Banka and Christine Rasmussen, CERN summer students (summer 2010, summer 2011)
- Johanna Bronner, master student co-supervised in the Freiburg group (2008-2009)

Professional Service

University Service

- (since Fall 2022) Member of the Senate Committee "University Environmental Committee" and of the related Clean Energy Task Force

Department Service

- (Fall 2023) Member of the Department Chair Search Committee
- (Fall 2023) Member of Faculty Search Committee (TT position in High Energy Physics - neutrino)
- (Spring 2023) Chair of Faculty Search Committee (non-TT position in High Energy Physics - neutrino)
- (Spring 2023) Member of Faculty Search Committee (TT position in High Energy Physics - collider)
- (since Spring 2022) Member of the Department's Diversity Committee
- (Fall 2021) Chair of Faculty Tenure Committee (for Sergey Syritsyn)
- (Fall 2017, Spring 2022, Spring 2023) Organizer of High Energy Physics Seminars
- (since Fall 2017) Member of the Colloquium Committee
- (since 2017) Member or Chair of many oral exam/PhD/Master's thesis committees at Stony Brook (e.g. for Liam Fox, Mars Lyukova, Yan Ke, Samuel Homiller, Siddharth Vadnerkar, Kyle Lee)
- (since 2017) Member of several external thesis committees (SMU Dallas, LAL Orsay Paris and TU Wien, Austria)