

-CV (2023)-

## Prof. dr. Marcel Vreeswijk

Born 9/2/1969 in Amsterdam, the Netherlands.

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I studied experimental physics from 1987 to 1992 at the University of Amsterdam and conducted my PhD-research at the ZEUS experiment at the HERA accelerator in Hamburg. In 1996, I was awarded a CERN-fellowship and got involved in the ALEPH(LEP II) and ATLAS (LHC) experiment. In the period 1999-2005, I worked in the analysis of top quark pair production of the Dzero experiment at Fermilab in the USA.

Meanwhile, for ATLAS at Nikhef/UvA, I focused on the construction of the muon detectors, which later played a key role in the discovery of the Higgs particle in 2012. For this, my Nikhef colleague and me obtained the Snellius medal in 2015. At present, my research focuses on top quark production in the ATLAS experiment, and, I am responsible for the development and construction of a tracking-sub-detector to be installed in ATLAS for the LHC upgrade in 2027. In 2020, I was appointed as a professor in top quark physics at the UvA.

My first experience with teaching started when I was a PhD-student. Since then, I am involved in the development, modernisation, coordination, lecturing of several courses. I have been director of the bachelor programme Physics&Astronomy and was heavily involved in the fusion of the bachelor programmes of the UvA and VU, which led to the Joint-Degree programme (2016).

## Research Activities

- 2023- now: Ambassador “Molecular and Materials Design” committee FNWI
- 2019- now: Project Leader for Nikhef and responsible for the Dutch contributions to the Inner Tracker activities. Project-Engineer for ATLAS ITk strips. In this function, I am responsible for all (international) engineering issues in the construction of the strip detector. As a physicist, my main role is to ensure that specifications based on physics requirements are met.
- 2016- now: Top-Spin Physics. Co-leader of the joint ‘Top-Spin’ project of the Nikhef-ATLAS and Nikhef-Theory group. Promotor of PhD student Marc de Beurs.  
In 2019 we received a IoP-UvA grant for a PhD student to further establish this research: promotor of PhD student Jordy Degens.
- 2014- now: ATLAS (LHC, CERN) Inner Tracker (ITk) upgrade. Activity coordinator for the Global Support Structure for ATLAS. Co-author Technical Design Report. The objective is to construct one End Cap of the ITk at Nikhef in Amsterdam.
- 2011: Invited to become contact person for the Top quark fakes group in the ATLAS experiment. Declined to focus on other duties.
- 2006-2013: Top quark (or related) physics in ATLAS (LHC, CERN) research at Nikhef. Supervisor/Co-promotor dr Manouk Rijpstra (Search for Little Higgs in ATLAS), dr Hurng Chun Lee (Single top Wt production in ATLAS), dr Daniel Geerts (Single top t-channel production in ATLAS), dr Rogier van der Geer (Single top t-channel Polarization in ATLAS).
- 2003-2004: Top quark co-convenor in the Dzero experiment (Tevatron, Chicago)
- 2000-2005: Top quark (or related) physics research in the Dzero experiment (Tevatron, Chicago) at Nikhef.  
Supervisor/Co-promotor dr Onne Peters (B-quark production in Dzero), prof dr Freya Blekman (Hadronic top quark pairs in Dzero), dr Pieter Houben (Top mass measurement in Dzero).
- 1999-2004: R&D and production of ATLAS muon chambers at Nikhef as post-doc.  
Co-promotor: dr Martin Woudstra (ATLAS muon system),
- 1996-1999: R&D of the ATLAS(LHC) muon system.  
Coordinator Muon system test setup (Datcha) at CERN as CERN-fellow.
- 1996-1999: Physics analysis of Triple Gauge boson Couplings in the ALEPH experiment (LEP II) as CERN-fellow.
- 1992-1996: Detector R&D and physics analysis for the ZEUS experiment (DESY, Hamburg) as Nikhef PhD student.  
Thesis: *Measurement of the Structure Function F<sub>2</sub> and the Gluon Density of the Proton*. Promoter: Prof. Dr. J.J. Engelen. Graduation date: 16/12/1996.

## Activities Educational Management:

- 2021-now: Chairperson of the BKO committee FNWI
- 2019-2021: Director of the College of Sciences (Physics&Astronomy, Math, Chemistry).
- 2014-2018: Director of the Joint-Degree programme Physics and Astronomy UvA en VU.
- 2014-2015: Member of the ECE committee – Advisory Committee VU/UvA Physics and Astronomy education.
- 2012-2013: Chairman of the VUVA committee to design the Joint UvA and VU Physics and Astronomy bachelor programme.
- 2012-2014: Director of the bachelorprogramme Physics and Astronomy UvA.
- 2010-2011: Chairman of the Curriculum committee bachelor programme Physics and Astronomy (UVA) to implement recommendations “UvA-Studiesucces”.
- 2005-2010: Member Program Board Physics and Astronomy.

## Activities as Physics Lecturer:

- 2022-now: Developer/coordinator Materials-in-Motion course for bachelor programme ‘Science, Technology and Innovation’.
- 2019- now: Developer/coordinator/lecturer course Vibrations and Waves
- 2016- now: Co-developer/coordinator/lecturer course Quantum Mechanics I.
- 2010-2018: Co-developer/coordinator/lecturer course Vibrations, Waves and Optics.
- 2002-2009: Co-developer/coordinator/lecturer course Electromagnetism; developer of digital questions and implementation of the Studio Classroom Concept. (published at GIREP conference 2006, Amsterdam, The Netherlands, 21 August 2006).
- 2002-2007: Co-developer/coordinator/lecturer course Numerical Physics.
- 1998- now: Supervisor/Advisor of several Research-Projects for Bachelor and Master students.

## Education Projects

- 2022-now: Introduction of the SCALE-UP format in Quantum Mechanics with J. Feldman, N. Brouwer and A.P. Colijn.
- 2012-2019: Member of several advisory committees (klankbordgroepen), recently FNWI-*‘blended learning’*, FNWI-*‘teaching and learning centre’*, FNWI-*‘docent professionalisering’*.
  - 2015: Projectleader grassroots: *‘van het krijt- naar tablet tijdperk’*, to use digital tablets in teaching.

- 2014: Projectleader grassroots 'de kracht van krijtloos', a pilot-project for the 'van het krijt- naar tablet tijdperk' project.
- 2013: Projectleader 'Tentamenlade', an ICAB project for digitalization of the exam-question in science education.
- 2007: Member NiNa workgroup Airshowers for the physics programme at High-schools.

## Outreach Work

- 2011- now: Member of the advisory-council of Natuurkunde.nl.
- 2012- now: Member of the advisory-council of NNV (Dutch Physics Society).
- 2000- now: Several contributions such as: Nemo-festivals, Nemo-wakker-worden-lezing, UvA open-days, mastercourse UvA/Nikhef' – initiated first visit to CERN for higschool teachers, development Muonlab set-up for labwork/outreach (profielwerkstukken), schoolvisits, etc.

## Publications

My publication list contains over 1000 publications and can be found at url:  
<https://www.uva.nl/profiel/v/r/m.vreeswijk/m.vreeswijk.html#Publicaties>

The following list provides a brief overview of my research work.

- *Measurement of the polarisation of single top quarks and antiquarks produced in the t-channel at 13 TeV and bounds on the tWb dipole operator from the ATLAS experiment*, JHEP11(2022)040, [[https://doi.org/10.1007/JHEP11\(2022\)040](https://doi.org/10.1007/JHEP11(2022)040)]
- *Technical Design Report for the ATLAS ITk- Strips Detector*, ATLAS Collaboration, CERN-LHCC-2017-005
- *Search for single b\*-quark production with the ATLAS detector at  $\sqrt{s} = 7\text{TeV}$* . By ATLAS Collaboration, j.physletb.2013.03.016. Phys.Lett. B721 (2013) 171-189.
- *A particle consistent with the Higgs Boson observed with the ATLAS Detector at the Large Hadron Collider*. By ATLAS Collaboration , Science 338 (2012) 1576-1582.
- *Measurement of the top quark-pair production cross section with ATLAS in pp collisions at  $\sqrt{s} = 7\text{TeV}$* , ATLAS collaboration, Eur. Phys. J. C71:1577, 2011
- *Looking for signatures of the left-right twin higgs model with the ATLAS detector at the LHC*. By S. Ferrag et al., ATL-PHYS-PUB-2008-004
- *The ATLAS Experiment at the CERN Large Hadron Collider*. By ATLAS Collaboration, JINST 3 (2008).  
*Expected Performance of the ATLAS Experiment - Detector, Trigger and Physics*. By ATLAS Collaboration, [arXiv:0901.0512 [hep-ex]].
- *Twin-tubes: 3-D tracking based on the ATLAS muon drift tubes*. By M. Woudstra et al., Nucl.Instrum.Meth. A560 (2006) 264-268.

- *First system performance experience with the ATLAS high precision muon drift tube chambers.* By H. van der Graaf et al., Nucl.Instrum.Meth. A419 (1998) 336-341.
- *Measurement of triple gauge  $W W$  gamma couplings at LEP-2 using photonic events.* By ALEPH Collaboration, Phys.Lett. B445 (1998) 239.
- *Measurement of the  $F_2$  structure function in deep inelastic  $e+ p$  scattering using 1994 data from the ZEUS detector at HERA.* By ZEUS Collaboration, Z.Phys. C72 (1996) 399-424.
- *Extraction of the gluon density of the proton at small  $x$ .* By ZEUS Collaboration, Phys.Lett. B345 (1995) 576-588.

## Recent Talks

- *De ontdekking van het Higgs deeltje, ouderdag NSA (Amsterdam), 2023*
- *Whelicity and Top Polarisation,* (online) Talk give at the 11th International Workshop on the CKM Unitarity Triangle, CKM2021
- *De zoektocht naar de bouwstenen van de natuur.* Viva Fysica (Amsterdam), 2020
- *Single top-quark production and properties measurements using the ATLAS detector.* Talk given at ICHEP2018, Seoul (South Korea), July 2018.
- *The power of the Entanglement of Research, Outreach and Education.* Talk given at the Route5-Dutch Scientific Agenda Meeting, Amsterdam, March 2016.
- *Tentamenlade*  
Talk given at the ICAB2013 conference, Nijkerk, 2013.
- *Waarom Drijf je in de Dode Zee?*  
Talk given at Nemo, Amsterdam, 2012.
- *(Invitation for talk on ATLAS-SUSY results at SILAF2012, Sao Paulo.*  
Declined to focus on other duties.)
- *Standard model results of the ATLAS experiment at the LHC*  
Talk given at Physics@FOM, Veldhoven, 2011.

## Prizes, Rewards, Grants

- IoP-UvA grant for PhD student for Top-Spin research (2019-2023)
- Projectruimte 460keuro, *Top-Spin* (co-supervisor with Nikhef colleague Eric Laenen), awarded by FOM. (2015-2019).
- Grassrootprogramme 10keuro, van *Krijt- naar Tablet tijdperk* (2015-2016)
- Grassrootprogramme (UvA) 10keuro, *de Kracht van Krijtloos* (2014-2015).
- *Snellius Medal* for members of the Nikhef ATLAS group – awarded by Genootschap Natuur-, Genees- en Heelkunde (2015).
- Co-applicant NWO Large Scale Facilities 15Meuro, for LHC detector upgrades (2014).
- CERN fellowship (1996-1999).

## Received Education

- 2022: *Agile Management (Product-Owner) course*. (programme by the Agile Scrum Group)
- 2015-2016: *LOL: Leergang Onderwijskundig Leiderschap* (programme on educational leadership) by several experts in the field with visits to Yale (USA) and the Univ. Maryland (USA).
- 2002- now: Several specific workshops on presenting, meeting- and discussion techniques, annual interviews and leadership.
- 2008: *BKO*, Basic Qualification Teaching.
- 1992-1996: Assistant-Researcher (AIO) – UvA/Nikhef. PhD obtained December 1996.
- 1986-1992: Master of Science Physics and Astronomy UvA (cum laude).