

Dimitrios Ntounis

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(last updated: 18 November 2024)

EDUCATION

Stanford University, Stanford CA, 94305

06/2022 – ongoing

PhD in Physics & PhD Minor in Computer Science

- Specialization area: Experimental Particle Physics
- Research Interests: High Energy Physics, Physics at the LHC, Future Colliders
- Relevant graduate-level coursework:
 - Statistical Mechanics (PHYSICS 212)
 - Classical Electrodynamics (PHYSICS 220)
 - Statistical Methods in Experimental Physics (PHYSICS 266)
 - Quantum Field Theory (PHYSICS 330)
- Additional graduate-level coursework:
 - Artificial Intelligence – Principles and Techniques (CS 221)
 - Machine Learning (CS 229)
 - Introduction to Linear Dynamical Systems (EE 263)
 - Theoretical Neuroscience (APPPHYS 293)
 - Convex Optimization (EE 364A/CME 364A)
 - Engineering Design Optimization (AA 222/CS 361)

MS in Physics

10/2022 – 06/2024

- Awarded for 45 units of graduate-level coursework
- Degree conferral date: June 2024

National and Kapodistrian University of Athens (NKUA), Athens, Greece

09/2016 - 07/2021

BSc in Physics (240 ECTS)

- Grade: 9.89/10, Excellent (1st in my class of 300)
- Direction: Nuclear and Particle Physics
- Relevant Coursework:
 - Introduction to Nuclear Physics and Elementary Particles
 - Elementary Particles, Nuclear Physics
 - Nuclear Physics Laboratory
 - Special Topics in Nuclear Physics and Elementary Particles
 - Modern Quantum Physics and Applications
- Thesis: “Search for a Signal of New Physics with Four Jets in the Final State with the CMS Experiment at CERN”
Supervisor: Prof. Niki Saoulidou

Nationwide University Entrance Examination score: 19,560 / 20,000
(top 1% nationwide and 1st among all students entering Physics
Departments in Greece)

06/2016

PROFESSIONAL AND RESEARCH EXPERIENCE

RESEARCH

Research Assistant, Caterina Vernieri's Group & SLAC ATLAS Group

06/2023 – ongoing

(Contacts: Prof. Caterina Vernieri, SLAC)

- Higgs Physics with the ATLAS Experiment at the CERN LHC:
 - Core analysis member for the boosted, all-hadronic $VH(b\bar{b})$ Run-2 analysis
- ATLAS authorship qualification task:
 - HGTD integration in ACTS
 - 4D tracking (with timing information) at the HL-LHC
- Simulation Studies for the Cool Copper Collider (C³):
 - Beam- and machine-induced background and interplay with detector design
 - Luminosity optimization
 - Sustainable operations considerations
- Physics analyses for Future Colliders:
 - Double Higgs production at ILC/C³ in the ZHH channel
 - $H \rightarrow s\bar{s}$ sensitivity studies

Rotation Research Assistant, Gratta Lab

04/2023 – 06/2023

(Contacts: Prof. Giorgio Gratta, Stanford University)

- Tests of gravity at the micron scale using levitated microspheres, focusing on laser-beam wavefront modulation using a Spatial Light Modulator

Rotation Research Assistant, SLAC LUX-ZEPLIN (LZ) Group

01/2023 – 03/2023

(Contacts: Prof. Daniel Akerib, SLAC & Stanford University, & Dr. M.E. Monzani, SLAC)

- Dark Matter direct detection searches with the LZ experiment, focusing on correlation and optimization studies of analysis cuts targeting the removal of unphysical accidental background events

Rotation Research Assistant, SLAC ATLAS Group

06/2022 – 12/2022

(Contacts: Prof. Caterina Vernieri, SLAC)

- Higgs Physics with the ATLAS Experiment at the CERN LHC, focusing on the boosted full-hadronic analysis
- Beam- and machine-induced background simulation studies for the Cool Copper Collider (C3)

Research Assistant, CMS Dijet Resonance Search Team

02/2020 – 06/2022

(Contacts: Dr. Robert Harris, Fermilab, USA & Prof. Niki Saoulidou, NKUA, Greece)

- Participated in biweekly meetings with senior CMS scientists
- Delivered presentations contributing to ongoing CMS analyses, including calculations of non-asymptotic cross section limits and global significance estimation

Lab & Research Assistant, High Energy Physics Lab, NKUA, Greece

07/2019 - 07/2021

- Carried out research in the Exotica group of the CMS experiment at CERN
- Developed a novel technique of selection criteria optimization implementing Genetic Algorithms
- Investigated the use of gaussian process models for machine learning in High Energy Physics

TEACHING

Teaching Assistant for PHYSICS 152/252 (Introduction to Particle Physics)
(Instructor: Prof. Caterina Vernieri, SLAC)

04/2024 – 06/2024

- Sole teaching assistant responsible for around 20 students (both graduate and undergraduate), leading weekly discussion sections, holding biweekly office hours, reviewing and updating lecture and section notes and preparing exercises for weekly problem sets

Teaching Assistant for PHYSICS 166/266 (Statistical Methods in Experimental Physics)
(Instructor: Prof. Ariel Schwartzman, SLAC)

01/2024 – 03/2024

- Sole teaching assistant responsible for 10 students (6 graduate students, 4 undergraduates), leading weekly discussion sections with a theoretical and computational component, holding biweekly office hours, reviewing and updating exercises for weekly problem sets

Teaching Assistant for PHYSICS 43 (Electricity and Magnetism)
(Instructor: Prof. Mark Kasevich, Stanford University)

04/2023 – 06/2023

- Responsible for 30 students, helping with questions during lectures and leading weekly discussion sections involving lecture material overview and collaborative problem solving

Private Tutor Volunteer in university level Physics courses, Athens, Greece

09/2018 - 10/2021

- Taught courses of Classical Mechanics, Mathematical Physics, Special Relativity, Electromagnetism and Elementary Particles to small groups of Physics and Engineering students

PUBLICATIONS

PUBLISHED IN PEER-REVIEWED JOURNALS

1. [June 2024] **D. Ntounis**, E.A. Nanni and C. Vernieri, “Luminosity and beam-induced background studies for the Cool Copper Collider”, Phys. Rev. Accel. Beams **27**, 061001
2. [March 2024] ATLAS Collaboration, **D. Ntounis**, “Study of High-Transverse-Momentum Higgs Boson Production in Association with a Vector Boson in the $qqbb$ Final State with the ATLAS Detector”, Phys. Rev. Lett. **132**, 131802¹
3. [October 2023] M. Breidenbach, B. Bullard, E. A. Nanni, **D. Ntounis**, and C. Vernieri, “Sustainability Strategy for the Cool Copper Collider”, PRX Energy **2**, 047001
4. [July 2023] C. Vernieri, **D. Ntounis** et al., “A ‘Cool’ route to the Higgs boson and beyond. The Cool Copper Collider”, JINST **18** P07053
5. [July 2023] CMS Collaboration, **D. Ntounis**, “Search for resonant and nonresonant production of pairs of dijet resonances in proton-proton collisions at $\sqrt{s} = 13$ TeV”, J. High Energ. Phys. **2023**, 161 (2023)²

INTERNAL DOCUMENTS

1. [October 2023] ATLAS Collaboration Internal Note HIGG-2021-11 (internal ATLAS document): “Measurement of high-momentum Higgs boson production in association with a vector boson in the $qqbb$ final state with the ATLAS detector”
2. [December 2021] CMS Collaboration Analysis Note AN-20-190 (internal CMS document): “Searches for paired dijet resonances with the full Run II dataset at 13 TeV”

¹Granted exceptional authorship by the ATLAS collaboration for significant contributions to the paper.

²Granted exceptional authorship by the CMS collaboration for significant contributions to the paper.

IN REVIEW

1. [June 2024] W. H. Tan, G. White, **D. Ntounis**, Z. Li, D. Kim, H. Xu, E. Simakov, and E. A. Nanni, *"Emittance Preservation in the C³ Main Linear Accelerator"*, submitted to Nuclear Inst. and Methods in Physics Research A

TALKS

TALKS AT CONFERENCES

1. [October 2024] Third ECFA Workshop on e^+e^- Higgs/EW/Top Factories:
 - (a) Parallel session talk: *"Evaluating strange-tagging performance for SiD fast- and full-simulation"*
 - (b) Parallel session talk: *"Bunch Structure Studies at C³"*
 - (c) Co-author of one more talk: *"Projections for Higgs self-coupling measurements with double Higgs production with ILD at multiple CoM energies"*
2. [July 2024] 42nd International Conference on High Energy Physics (ICHEP 2024):
 - (a) Parallel session talk: *"Sustainability Strategy for the Cool Copper Collider"*
3. [July 2024] 2024 International Workshop on Future Linear Colliders (LCWS2024):
 - (a) Parallel session talk: *"Luminosity Studies for the Cool Copper Collider"*
 - (b) Parallel session talk: *"Beam-Induced Backgrounds at the Cool Copper Collider"*
 - (c) Co-convenor of the Early-Career-Researcher (ECR) Panel.
 - (d) Co-author of two more talks: *"A Sustainability Strategy for the Cool Copper Collider"* and *"Towards an update of the ILD ZHH analysis"*
4. [October 2023] Second ECFA Workshop on e^+e^- Higgs/EW/Top Factories:
 - (a) Parallel session talk: *"Beam-induced background simulation studies for C³"*
 - (b) Co-author of two more talks: *"Optimizing the Higgs self-coupling measurement at ILC and C³"* and *"Out-of-Time Pileup Mixing for the C³ Collider Concept"*.
5. [May 2023] 2023 International Workshop on Future Linear Colliders (LCWS2023):
 - (a) Parallel session talk: *"Muon Backgrounds from Beam Interactions with the Accelerator Structure at C³"*
 - (b) Presentation at Early Career Poster Session: *"Simulation of Beam- and Machine-induced Backgrounds for the Cool Copper Collider"*
 - (c) Co-author of two more talks: *"Pair Production and Hadron Photoproduction Backgrounds at C³"* and *"Sustainability studies for the Cool Copper Collider"*

INVITED TALKS AT WORKSHOPS/MEETINGS

1. [June 2024] *"Sustainability Strategy for the Cool Copper Collider"* at the Sustainable HEP 2024 - 3rd edition workshop.
2. [March 2024] *"Simulation of Beam-Related Backgrounds at Higgs Factories"* at the Open Meeting of the ILC International Development Team (IDT-WG3-Phys Working Group).
3. [February 2024] *"Activities/plans from C³ event generators"* at the Meeting on Event Generator for Linear Colliders.
4. [February 2024] *"Luminosity Studies"* at the SLAC Cool Copper Collider Workshop.
5. [January 2024] *"Beam-beam simulations for e^+e^- Higgs factories"* at the SLAC Multi-TeV Beam-Beam meeting
6. [February 2023] *"Overview of beam- and machine-induced background studies for C³"* at the 2nd general meeting of the ILC-Japan Physics Working Group.

HONORS & AWARDS

- | | |
|--|---------|
| • 26th National Physics Competition, 2nd place among all 12th grade students | 03/2016 |
| • 25th National Physics Competition, 3rd place among all 11th grade students | 03/2015 |
| • 24th National Physics Competition, 4th place among all 10th grade students | 03/2014 |

SKILLS

- Programming: C/C++, Python, Julia
- Software Tools: Mathematica, ROOT, CMS Higgs Combination Toolkit (“Combine”)

SOCIETIES & AFFILIATIONS

- | | |
|---|-------------------|
| • Mentor for the Stanford University Physics Society Graduate Mentoring Program | 10/2024 - ongoing |
| • Financial Officer of the Hellenic Association of Stanford | 09/2023 - ongoing |
| • Member of the ATLAS Collaboration at CERN (“Doctoral Student”) | 06/2022 - ongoing |
| • Member of the CMS Collaboration at CERN (“Non-Doctoral Student”) | 09/2019 - 06/2022 |

LANGUAGES

- English (fluent), German (fluent), Greek (native)