

CURRICULUM VITAE

NIKOS DOKMETZOGLOU

BIOGRAPHICAL INFORMATION

- Full Name: Nikolaos Dokmetzoglou
- DOB: May 23, 1995
- Nationality: Greek

EDUCATION

University of North Carolina at Chapel Hill

Doctor of Philosophy (PhD) in Physics

Master of Science (MSc) in Physics

Chapel Hill, NC, USA

August 2023

December 2019

Davidson College

Bachelor of Science (BSc) in Physics

- Magna Cum Laude, Honors in Physics, Minor in Mathematics
- Cumulative GPA: 3.96 Major GPA: 3.98 Minor GPA: 4.00

Davidson, NC, USA

May 2017

Athens College (Hellenic-American Educational Foundation)

Highschool Diploma, Salutatorian 2013

Athens, Greece

July 2013

SUMMER / WINTER SCHOOLS

Deutsches Elektronen-Synchrotron (DESY) Hamburg

Computer Algebra and Particle Physics (CAPP) 2023

Online

July 2023

Charles University

Amplitudes 2022 Summer School & Conference

Prague, Czech Republic

August 2022

Mainz Institute for Theoretical Physics

MITP School 2021: The Amplitude Games

Online

July 2021

Institut de Physique Théorique (IPhT), CEA/CNRS-Saclay

SAGEX Mathematica & Maple School

Online

January 2021

Brown University

Amplitudes 2020 (Zoomplitudes) Master Class & Conference

Online

May 2020

Instituto de Física Teórica (IFT) UAM-CSIC

Summer IFT School (SIFTS) 2019

Madrid, Spain

July 2019

Perimeter Institute for Theoretical Physics

Tri-Institute Summer School on Elementary Particles (TRISEP) 2018

Waterloo, ON, Canada

July 2018

University of California, Davis, QMAP

Amplitudes 2018 Summer School

Davis, CA, USA

June 2018

RESEARCH EXPERIENCE

National Centre of Scientific Research "Demokritos"

Athens, Greece

*Postdoctoral Researcher**October 2023 – Present*

- Joined the efforts of the research group of **Dr. Costas Papadopoulos**, at the Institute of Nuclear and Particle Physics of the National Centre of Scientific Research "Demokritos", to analytically express all **five-point two-loop master integrals** with one off-shell leg and to provide computational tools for their efficient numerical evaluation, using the so-called **simplified differential equations** approach.

Max Planck Institute for Physics

Munich, Germany

*Visiting Researcher**January 2023 – February 2023*

- Briefly joined the quantum field theory and scattering amplitudes research group at the Max Planck Institute for Physics in Munich, led by **Prof. Johannes Henn**, and begun an investigation on the remnants of **conformal symmetry** in **loop-level scattering amplitudes**.

University of North Carolina at Chapel Hill

Chapel Hill, NC, USA

*Doctoral Dissertation Research**Fall 2018 – Summer 2023*

- ["Conformal Yangian and Tree Amplitudes in Scalar and Gauge Field Theories"](#)
- Conducted research in **quantum field theory** under the guidance of **Prof. Louise Dolan**.
- Proved the algebraic consistency of the **conformal Yangian** $Y[\text{SO}(2, n)]$, i.e. the infinite-dimensional Yangian extension of the conformal group $\text{SO}(2, n)$, where n is the number of space-time dimensions, by showing that the momentum-space differential operator representation of its generators satisfies the so-called Serre relation, for both scalar and spin-one gauge fields.
- Investigated the action of the conformal Yangian generators on the **tree-level scattering amplitudes of scalar $\lambda \phi^3$ theory and pure Yang-Mills theory**, two non-supersymmetric field theories which are connected through the Cachazo-He-Yuan (CHY) scattering equations formalism and known to be conformally invariant at tree-level in $n=6$ and $n=4$ space-time dimensions, respectively. Examined the action of the $Y[\text{SO}(2, n)]$ generators on the **off-shell scattering polynomials** appearing in the polynomial form of the CHY formalism.

Davidson College

Davidson, NC, USA

*Merzbacher Summer Research Fellow**Summer 2018**Honors Thesis in Physics**Fall 2016 – Spring 2017**Weinstein Davidson Research Initiative Summer Research Fellow**Summer 2016*

- "Implementation of Recursion Relations in Gluon Scattering Amplitude Calculations in $\text{AdS}_4/\text{CFT}_3$ "
- Conducted research in **quantum field theory** under the guidance of **Prof. Savan Kharel**.
- Used generalized Britto–Cachazo–Feng–Witten (BCFW) recursion relations and the spinor-helicity formalism to compute four-point and five-point tree-level gluon scattering amplitudes in $\text{AdS}_4/\text{CFT}_3$ (Anti-de Sitter/Conformal Field Theory). Used the symbolic manipulation system FORM and Mathematica to simplify amplitude calculations.

Davidson College*Independent Research in Physics**Davidson College Faculty Study and Research Grant Summer Research Fellow***Davidson, NC, USA***Spring 2016**Summer 2015*

- “Momentum Tails of 1D, 2D, and 3D Quantum Systems”
- Conducted research in **quantum mechanics** under the guidance of **Prof. Mario Belloni**.
- Utilized Mathematica and its parallel processing capabilities to study the large-momentum behavior of the momentum-space wavefunctions of different quantum systems. Discovered a dependence of the large-momentum $1/P^\beta$ tail of the momentum-space wavefunction on the dimensionality and the potential energy function of a given quantum system.

PUBLICATIONS

N. Dokmetzoglou and L. Dolan, *Properties of the Conformal Yangian in Scalar and Gauge Field Theories*, *JHEP* **02** (2023) 137 [[arXiv: 2207.14806](https://arxiv.org/abs/2207.14806) [hep-th]].

N. Dokmetzoglou, *CONFORMALYANGIAN: a MATHEMATICA Package for Computations Related to the Action of the Conformal Yangian $Y[SO(2,n)]$* , in preparation.

PRESENTATIONS

“Conformal Yangian and Tree Amplitudes in Scalar and Gauge Field Theories”

- [NCSR Demokritos INPP Seminar](#), Athens, Greece, June 2023 (Online)

“Implementation of Recursion Relations in Gluon Scattering Amplitude Calculations in AdS_4/CFT_3 ”

- [APS April Meeting 2017](#), Washington, DC, USA, January 2017
- [Quadrennial Physics Congress \(PhysCon\) 2016](#), Silicon Valley, CA, USA, November 2016

TEACHING EXPERIENCE

University of North Carolina at Chapel Hill*Graduate Teaching Assistant***Chapel Hill, NC, USA***Fall 2017 – Spring 2023*

- PHYS 118 – Introductory Calculus-based Mechanics and Relativity *5 semesters*
- PHYS 119 – Introductory Calculus-based Electromagnetism and Quanta *7 semesters*
- PHYS 115 – General Physics II: For Students of the Life Sciences *1 semester*
- PHYS 701 – (Graduate) Classical Dynamics *3 semesters*
- PHYS 712 – (Graduate) Electromagnetic Theory *3 semesters*

Davidson College*Physics Tutor, Center for Teaching and Learning***Davidson, NC, USA***Fall 2015 – Spring 2017*

LEADERSHIP EXPERIENCE

Society of Physics Students (National)
Zone 5 (NC and SC) Associate Zone Councilor

Davidson, NC, USA
June 2016 – June 2017

Society of Physics Students (Davidson College Chapter)
President
Vice-President of Professional Affairs

Davidson, NC, USA
March 2016 – March 2017
March 2015 – March 2016

HONORS / AWARDS

- Hamilton and Silver Awards, UNC Chapel Hill, 2023
- Hamilton and Silver Awards, UNC Chapel Hill, 2022
- Hamilton Award, UNC Chapel Hill, 2021
- [Outstanding Graduate Teaching Assistant Award](#), UNC Chapel Hill, 2020
- Merzbacher Fellowship, UNC Chapel Hill, 2018
- [Honors in Physics](#), Davidson College, 2017
- [Physics Award](#), Davidson College, 2017
- [Theoretical/Computational Physics Poster Award](#), PhysCon 2016

HONOR SOCIETIES / PROFESSIONAL MEMBERSHIPS

- Member of: ΦBK (2017), ΣΠΣ (2016), Bernard Society of Mathematics (2015)
- Member of: American Physical Society (2013), Society of Physics Students (2013)

SKILLS

- Proficient in Mathematica, LaTeX, Microsoft Office, and Adobe Acrobat Pro.
- Experience with Maple, FORM, Linux Kernel, Java, LabVIEW, Multisim, and Arduino.
- Fluent in English and Greek (native language). Some knowledge of Spanish and German.