CURRICULUM VITAE

NIKOS DOKMETZOGLOU

BIOGRAPHICAL INFORMATION

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

EDUCATION

University of North Carolina at Chapel Hill — **Chapel Hill, NC, USA**
Doctor of Philosophy (PhD) in Physics — *August 2023*
Master of Science (MSc) in Physics — *December 2019*

Davidson College — **Davidson, NC, USA**
Bachelor of Science (BSc) in Physics — *May 2017*
- Magna Cum Laude, Honors in Physics, Minor in Mathematics
- Cumulative GPA: 3.96 Major GPA: 3.98 Minor GPA: 4.00

Athens College (Hellenic-American Educational Foundation) — **Athens, Greece**
Highschool Diploma, Salutatorian 2013 — *July 2013*

SUMMER / WINTER SCHOOLS

Deutsches Elektronen-Synchrotron (DESY) Hamburg — **Online**
Computer Algebra and Particle Physics (CAPP) 2023 — *July 2023*

Charles University — **Prague, Czech Republic**
Amplitudes 2022 Summer School & Conference — *August 2022*

Mainz Institute for Theoretical Physics — **Online**
MITP School 2021: The Amplitude Games — *July 2021*

Institut de Physique Théorique (IPhT), CEA/CNRS-Saclay — **Online**
SAGEX Mathematica & Maple School — *January 2021*

Brown University — **Online**
Amplitudes 2020 (Zoomplitudes) Master Class & Conference — *May 2020*

Instituto de Física Teórica (IFT) UAM-CSIC — **Madrid, Spain**
Summer IFT School (SIFTS) 2019 — *July 2019*

Perimeter Institute for Theoretical Physics — **Waterloo, ON, Canada**
Tri-Institute Summer School on Elementary Particles (TRISEP) 2018 — *July 2018*

University of California, Davis, QMAP — **Davis, CA, USA**
Amplitudes 2018 Summer School — *June 2018*

PUBLICATIONS

N. Dokmetzoglou and L. Dolan, *Properties of the Conformal Yangian in Scalar and Gauge Field Theories*, *JHEP* **02** (2023) 137 [arXiv: 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.

RESEARCH EXPERIENCE

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** $Y[\mathrm{SO}(2, n)]$, i.e. the infinite-dimensional Yangian extension of the conformal group 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 $Y[\mathrm{SO}(2, n)]$ 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 AdS_4/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 AdS_4/CFT_3 (Anti-de Sitter/Conformal Field Theory). Used the symbolic manipulation system FORM and Mathematica to simplify amplitude calculations.

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

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 **Chapel Hill, NC, USA**
Graduate Teaching Assistant *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 **Davidson, NC, USA**
Physics Tutor, Center for Teaching and Learning *Fall 2015 – Spring 2017*

LEADERSHIP EXPERIENCE

Society of Physics Students (National) **Davidson, NC, USA**
Zone 5 (NC and SC) Associate Zone Councilor *June 2016 – June 2017*

Society of Physics Students (Davidson College Chapter) **Davidson, NC, USA**
President *March 2016 – March 2017*
Vice-President of Professional Affairs *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: ΦΒΚ (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.