George Alexander **Davila**

DATE OF BIRTH: FEB. 8, 1994 · PLACE OF BIRTH: BROOKLYN, NEW YORK · CITIZENSHIP: UNITED STATES

4111 Libra Drive, Physical Sciences Bldg. 430, Orlando, FL 32816-2385

☐ +1 (845) 803-6319 | ✉ GDavila@knights.ucf.edu | in george-davila

Education

NYU Shanghai	*Fall 2018 - Spring 2019*
Visiting Studentship	*Shanghai, China*

M.Sc., Physics	*July 2018*
UNIVERSITY OF CENTRAL FLORIDA	*Orlando, Florida, United States*

- Advisor: Prof. & Chair **Eduardo Mucciolo**
- Thesis: *Applications of Quantum Matrix Product States to Information Compression* (to be defended July 2018)
- Attending through a fellowship awarded by the American Physical Society (APS)

B.Sc., Physics	*May 2016*
Fordham University	*New York City, New York, United States*

B.Sc., Mathematics	*May 2016*
Fordham University	*New York City, New York, United States*

Stanford University	*Stanford, California, United States*
Education Program for Gifted Youth (pre-collegiate/non-degree)	*2010 - 2012*

Publications

Articles

1. *Applications of Quantum Matrix Product States to Information Compression* (tentative title), **Master's Thesis**, by G. Davila (in preparation), Advisor: Eduardo Mucciolo

2. α-*Decay Modelled as a Quantum Tunneling Through a Cornell Potential*, by G. Davila, (in preparation)

3. *Unphysical phases in staggered chiral perturbation theory*, by C. Aubin, K. Colletti, and G. Davila, Phys. Rev. D 93, 085009 (Apr. 2016)

4. *Limits on Observation in Quantum Gravity and Black Holes*, by G. Davila, arXiv:1409.4365 [physics.gen-ph] (Sept. 2014)

Conference Proceedings

1. **APS 2018 April Meeting.** Abstract ID # L01.00048: *Statistical Manifold Construction of General Relativity.*

2. **UCF Graduate Research Forum 2018**, *Quantum Information Theory: Matrix Product State Algorithms & Current Applications to Information Compression.*

3. **APS 2018 March Meeting.** Abstract ID #: G60.00343, *Classical Simulation of Quantum Computations: Application of Matrix Product State Approach to the Compression of DNA Bit Strings.*

4. **Nov. 2017 84th Annual Meeting of the APS Southeastern Section.** Abstract # W1.00070, *Quantum Many-Body Theory: Tensor Network Approach and Applications to Information Compression.*

5. **Feb. 2017 APS Graduate Education and Bridge Program Conference.** Abstract # PS2.00014, *Unphysical phases in staggered chiral perturbation theory.*

6. **Oct. 2016 SACNAS National Diversity in STEM Conference.** *Constructing a Holographic Higgs: The Guage/Gravity Duality and Lattice Quantum Field Theories.*

Software Repositories

1. G. Davila, *Tests and Examples of Machine Learning in Wolfram Coding Architecture*, Wolfram Cloud Object, https://www.wolframcloud.com/objects/68a3876b-13fd-4267-8d7f-448ec2a5ee80

2. G. Davila, *Generalizations of the Riemann Zeta Function*, GitHub repository, https://github.com/GeorgeDavila/GenZetaFns.git

Research History

Future Interests: Quantum thermodynamics, quantum information, quantum computing
Methodologies: Mathematical & Computational (with specific experience in tensor networks & machine learning)

Quantum Information Theory
University of Central Florida

ADVISOR: PROF. EDUARDO MUCCIOLO | *Jan. 2017 - PRESENT*

- Examining the applicability of using quantum computing algorithms as a means of compressing large sets of information on classical computers.
- Presented at Nov. 2017 APS Southeast Regional Conference. Abstract # W1.00070
- To be presented at 2018 APS March Meeting. Abstract # G60.00343

Conformal Lattice Field Theory and AdS/CFT
Fordham University

ADVISOR: PROF. CHRISTOPHER AUBIN | *Nov. 2015 - Aug. 2016*

- Examined putting Conformal Field Theories on the lattice using radial quantization techniques. The goal of this project was to obtain gravitational duals to these discrete theories in order to gain new insights about how spacetime is quantized in quantum gravity.
- Awarded Spring 2016 research grant from Fordham University.
- Presentation spot at 2016 annual SACNAS conference.
- Presented at Spring 2016 Fordham University undergraduate research symposium.

Lattice QCD: Staggered Chiral Perturbation Theory (SχPT)
Fordham University

ADVISOR: PROF. CHRISTOPHER AUBIN | *Dec. 2014 - Dec. 2015*

- Explored general formulations of Staggered Chiral Perturbation Theory using mathematical and computational methods. Found that phases of the theory previously assumed to exist are actually unphysical for relevant regimes and identified bounds on the number of quarks in the theory.
- Presented at the Feb. 2017 APS Graduate Education and Bridge Program Conference. Abstract # PS2.00014. Presented at Fall 2015 and Spring 2016 Fordham University undergraduate research symposiums.
- Awarded Summer 2015 research grant from Fordham University
- **Publication:** *Unphysical phases in staggered chiral perturbation theory*, Phys. Rev. D 93, 085009 (Apr. 2016)

Mesonic Astroparticle Physics: Soliton Stars
Fordham University

ADVISOR: PROF. QUAMRUL HAIDER | *Sept. 2014 - May 2016*

- Studied non-topological soliton stars in the context of early universe cosmology. Lee-Wick scalar field theory was used to model the properties of these stars.

Evolutionary Psychology
Pre-Collegiate

ADVISOR: DR. LOIS BARISH, VARIOUS | *May 2009 - Aug. 2011*

- Studied the evolution of Human intelligence using data from anthropologists as well as primate researchers. Most novel portion of this research lied in the methods of numerical analysis used.
- Performed in collaboration with researchers at Harvard University & Columbia University.
- Resulted in several presentations at the high school level (including Westinghouse and Siemens).

Skills

Languages	English (native), Spanish (fluent), French (intermediate), Italian (intermediate), German (intermediate)
Coding	Python (advanced), Fortran (advanced), C++ (advanced), C (basic), HTML (intermediate), PHP (intermediate)
Programs	LaTeX (advanced), Mathematica (advanced), Maple (basic), SageMath (basic)

Selected Honors

2018	APS Group on Energy Research and Applications workshop travel award ($\sim$ $500 USD)
2016	APS Physics Graduate Education Fellowship ($\sim$ $170,000 USD)
2016	U.S. Army STEM educational outreach award
2016	Spring 2016 Fordham University Research Grant ($\sim$ $10,000 USD)
2015	Summer 2015 Fordham University Research Grant ($\sim$ $10,000 USD)
2012	Full Tuition Scholarship to Fordham University ($\sim$ $200,000 USD)
2012	Named a National Hispanic Honor Scholar
2010	Tuition Scholarship to Stanford University Education Program for Gifted Youth
2010	Full Tuition Scholarship to Harvard University Summer School Program
2006	American Mathematics Competition Bronze Medal

Teaching & Work History

Graduate Research Assistant	*University of Central Florida*
Research under Prof. Mucciolo as well as meeting demands of my APS fellowship.	*Aug. 2016 - PRESENT*
Graduate Teaching Assistant	*University of Central Florida*
Class: Introductory Physics Lab	*Aug. 2016 - Dec. 2016*
Undergraduate Physics Tutor	*Fordham University*
Consisted of tutoring undergraduates, primarily physics majors.	*Aug. 2015 - May 2016*
Laboratory Assistant	*Fordham University*
Consisted of preparing the instruction lab for use and assisting students.	*Sept. 2013 - May 2015*

References

Prof. & Chair Eduardo Mucciolo
University of Central Florida
email: mucciolo@physics.ucf.edu
Relation: Graduate Research Advisor and Master's Thesis Advisor

Prof. Christopher Aubin
Fordham University
email: caubin@fordham.edu
Relation: Undergraduate Research Advisor and Mentor