Alex Atanasov

Cell: (571) 268 - 4181 Email: atanasov@g.harvard.edu
Website: ABAtanasov.com Github: ABAtanasov

Education

Harvard University August 2018 - Present
PhD. Theoretical Physics

Yale University Graduated: May 2018
M.S. and B.S. Mathematics, B.S. Physics—*magna cum laude, PBK* GPAs: Physics 3.97; Math 4.00; Total 3.92

- **Undergrad Coursework in:** Modern Combinatorics, Algorithm Design and Analysis, Systems Programming and Organization
- **Graduate Coursework in:** Algebraic Geometry, the Langlands Program, Quantum & Conformal Field Theory, Statistical Physics

Experience

Software Engineering Intern: Machine Learning and Computer Vision May – August 2017
Google – Supervised by Dr. Nhat Vu *Mountain View, CA*
- Ported TensorFlow models to run on embedded devices for real-time face detection and recognition on video streams.
- Achieved a **6x speedup** in run-through time for inference vs. the start of the summer, **without loss in accuracy**.

Visiting Researcher: Sparse Grid Discretization for Relativistic Astrophysics May 2016 – January 2017
Perimeter Institute for Theoretical Physics – Supervised by Dr. Erik Schnetter *Waterloo, ON*
- One of seven students selected internationally to participate in Perimeter's undergraduate program.
- Wrote software package for solving partial differential equations in higher dimensions.
- Obtained speedup **from** $O(N^2)$ **to** $O(N \log N)$ in 2D and $O(N^3)$ **to** $O(N \log^2 N)$ in 3D at resolution N along each axis.

Undergraduate Researcher: Working Memory in Recurrent Neural Networks December 2015 – Present
Yale School of Medicine, Dept. of Psychiatry N3 Division – Supervised by Dr. John Murray *New Haven, CT*
- Built TensorFlow-based package for modeling neural behavior in various cognition tasks, based off medical data.
- Used CUDA, the Yale computing cluster, and high-dimensional data science tools to generate results for upcoming publication.

Multi-scale Modeling of Carbon Nanomaterials June 2014 – January 2016
MITRE Corporation Student Program – Supervised by Dr. James Ellenbogen *McLean, VA*
- Developed and published electrostatics-based model for quantum capacitance of carbon nanomaterials.

SEAP Program Student Researcher: Plasma Cloud Generation using Cavity Resonators May – August 2013
Naval Research Laboratory – Supervised by Dr. Paul Bernhardt *Washington D.C.*

Publications and Projects

Representations of the Physical Universe June 2017, Ongoing
- An open textbook on the concepts of modern physics. Intend to publish through Harvard in the spring.

Bootstrapping the Minimal 3D Superconformal Field Theory July 2018
- In collaboration with Prof. David Poland and Aaron Hillman. Journal of High Energy Physics

Magnetic Monopoles, 't Hooft Lines, and the Geometric Langlands Correspondence May 2018
- Senior Thesis under Prof. Philsang Yoo.

Sparse Grid Discretizations based on a Discontinuous Galerkin Method October 2017
- In collaboration with Dr. Erik Schnetter. In preparation for submission. arXiv:1710.09356

Analytic Formulas for Detachment Energies in Carbon Fullerenes March 2017
- In collaboration with Dr. James Ellenbogen. Physical Review A

GalerkinSparseGrids.jl August 2016
- Julia package for efficiently solving partial differential equations in high dimensional settings.

Complex Analysis: In Dialogue October 2013
- Independently published a 500-page pedagogical work on complex analysis in high school. Made for-sale on Amazon.

Honors and Awards

- **J.M. Pierce Fellowship** – For first-year graduate study in physics at Harvard 2018
- **Howard L. Schultz Prize in Physics** – To an outstanding senior in physics at Yale 2018
- **Mellon Grant Recipient** – To attend conference on the Langlands program as part of senior thesis research 2018
- **William L. Putnam Mathematics Competition** – Top 300 nationally 2016, 2018
- **Morse College Richter Fellow and Yale Dean's Research Fellow** – For summer research at Perimeter Institute 2016
- **United States Physics Olympiad Semifinalist** 2013

Skills

Programming: Python, C/C++, Julia, Mathematica, Java, MATLAB, HTML/CSS, Excel, R *(by experience most to least)*
Parallel tools: OpenMP, MPI, CUDA, TensorFlow, Julia toolkit. Strong background in high-performance computing.
Teaching: TA for Graduate Deep Learning, Representation Theory, Abstract Algebra, Complex and Vector Analysis at Yale. Mentor and Lecturer for Perimeter Institute's ISSYP (lecture video) and SRS Bulgaria.
Languages: English, Bulgarian (native speaker, can read and write), Latin (read and write, graduate coursework)
Other: Strong background in tutoring, public speaking, and academic lecturing. Last but not least, LaTeX.