

Alexander Atanasov

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EDUCATION

Harvard University PhD. Theoretical Physics, advised by Prof. Cengiz Pehlevan (Applied Math) • Work on deep neural networks, kernel machines, and Bayesian methods. • Extensive prior work (4+ papers) in string theory.	Aug 2018 - May 2024 (Expected) GPA: 4.00
Yale University M.S. and B.S. Mathematics, B.S. Physics— <i>magna cum laude</i> , <i>Phi Beta Kappa</i> • Undergrad Coursework in: Systems Programming and Organization, Algorithm Design, Modern Combinatorics, Game Theory • Graduate Coursework in: Algebraic Geometry, the Langlands Program, Quantum & Conformal Field Theory, Statistical Physics	Graduated: May 2018 GPAs: Physics 3.97; Math 4.00; Total 3.92

EXPERIENCE

Google – Software Engineering Intern <i>Machine Learning and Computer Vision</i> – Supervised by Dr. Nhat Vu • 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 .	May – Aug 2017 Mountain View, CA
Perimeter Institute for Theoretical Physics – Visiting Researcher <i>Sparse Grid Discretization for Relativistic Astrophysics</i> – Supervised by Dr. Erik Schnetter • One of seven students selected internationally to participate in Perimeter's undergraduate program . • Wrote Julia package for solving partial differential equations in higher dimensions. Published results to arXiv. • 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.	May 2016 – Jul 2018 Waterloo, ON
Yale School of Medicine, N3 Division – Undergraduate Researcher <i>Working Memory in Recurrent Neural Networks</i> – Supervised by Dr. John Murray • Built TensorFlow package for modeling neural behavior in cognitive tasks, based off medical data. • Used CUDA, the Yale computing cluster, and data science tools to generate results and figures. Published results.	Dec 2015 – May 2018 New Haven, CT
MITRE Corporation – Student Researcher <i>Multi-scale Modeling of Carbon Nanomaterials</i> – Supervised by Dr. James Ellenbogen • Developed and published electrostatics-based model for quantum capacitance of carbon nanomaterials.	Jun 2014 – Jan 2016 McLean, VA
Naval Research Laboratory – SEAP Program Student Researcher <i>Plasma Cloud Generation using Cavity Resonators</i> – Supervised by Dr. Paul Bernhardt	May – Aug 2013 Washington D.C.

SELECT PUBLICATIONS

For a full up-to-date list of 8+ papers, see my [Google Scholar](#)

Neural Networks as Kernel Learners: The Silent Alignment Effect • In collaboration with B. Bordelon and C. Pehlevan. arXiv:2111.00034 . In submission.	Nov 2021
(2,2) Scattering and the Celestial Torus • In collaboration with A. Strominger, A. Ball, W. Melton, and A. Raclariu. Journal of High Energy Physics	Jan 2021
Bootstrapping the Minimal 3D Superconformal Field Theory • In collaboration with D. Poland and A. Hillman. Journal of High Energy Physics	Jul 2018
Analytic Formulas for Detachment Energies in Carbon Fullerenes • In collaboration with J. Ellenbogen. Physical Review A	Mar 2017
Complex Analysis: In Dialogue • Independently published a 500-page pedagogical work on complex analysis in high school. Made for-sale on Amazon .	Oct 2013

HONORS AND AWARDS

• Fannie & John Hertz Fellowship – One of 11 students chosen from 850 to receive full graduate support (\$250k) over 5 years	2019
• DoD Graduate Fellowship (NDSEG) – One of 200 students chosen from 3,000 to receive full graduate support for 3 years	2019
• NSF Graduate Fellowship (declined) – One of 2k students chosen from 12k to receive full graduate support for 3 years	2019
• James Mills Pierce Fellowship – Full support 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 international conference on the Langlands program as part of senior thesis	2018
• William L. Putnam Mathematics Competition – Taken twice. Top 300 nationally both times.	2016, 2018
• United States Physics Olympiad Semifinalist	2013

SKILLS

Programming:	Python, Julia, Mathematica, C, C++, Java, MATLAB, Excel, R (<i>by experience most to least</i>)
Tools:	JAX, TensorFlow, PyTorch, NumPy, SkLearn, Pandas, SQL, OpenMP, CUDA. Strong background in data science & HPC.
Teaching:	TA for Grad. Deep Learning & Databases (2x), Rep. Theory, Abstract Algebra, Complex Analysis, & Vector Analysis (2x). Mentor and Lecturer for Perimeter Institute's ISSYP (lecture video) , SRS Bulgaria , and MIT's RSI Program .
Languages:	English (native), Bulgarian (native), Latin (read and write, graduate coursework)
Other:	Strong background in tutoring, public speaking, and lecturing. Last but not least, \LaTeX .