

# Alex Atanasov

216 Dwight Street, New Haven, CT 06511

Cell: (571) 268-4181 – Email: [alex.atanasov@yale.edu](mailto:alex.atanasov@yale.edu)

Website: [abatanasov.github.io](http://abatanasov.github.io) – Github: [github.com/ABAtanasov](https://github.com/ABAtanasov)

## EDUCATION

### Yale University

B.S. Physics, M.S./B.S. Mathematics

Overall GPA: 3.93/4.0

Graduation: May 2018

- **Relevant Undergraduate Coursework:** Modern Combinatorics, Design & Analysis of Algorithms, Systems Programming and Computer Organization “CS 323”
- **Relevant Graduate Coursework:** Complex Analysis, Einstein Gravity, Statistical Mechanics, Lie Algebras & Applications, Seminars in: Representation Theory, Algebraic Geometry, Quantum and Conformal Field Theory

### Thomas Jefferson High School for Science and Technology

Overall GPA: 4.41 weighted (corresponding to 3.92/4.0)

Graduation: June 2014

- **Relevant Post-AP Coursework:** Parallel Computing I & II, Numerical Analysis, Complex Analysis, Linear Algebra

## WORK & RESEARCH EXPERIENCE

### Software Engineering Intern: Machine Learning and Computer Vision

Google – Supervised by Dr. Nhat Vu

May – August 2017

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

Perimeter Institute for Theoretical Physics – Supervised by [Dr. Erik Schnetter](#)

May 2016 – January 2017

Waterloo, ON

- One of seven students selected internationally to participate in Perimeter’s [undergraduate program](#).
- Wrote a software package for solving Einstein’s equations, speeding up 2D models from  $\mathcal{O}(N^2)$  to  $\mathcal{O}(N \log N)$  and 3D models from  $\mathcal{O}(N^3)$  to  $\mathcal{O}(N \log^2 N)$  on large datasets, where  $N$  is the resolution.
- Organized 10 weekly *undergraduate lecture seminars*. Presented two lectures on complex & algebraic geometry.
- Selected as lecturer & guest mentor for the high schoolers in the [ISSYP program](#) (lecture video [here](#)).

### Undergraduate Researcher: Machine Learning for Emulation of Neuronal Networks

Yale School of Medicine, Dept. of Psychiatry N3 Division – Supervised by [Dr. John Murray](#)

December 2015 - Present

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 tools in high-dimensional data science to generate results for publication.

### Multi-scale Modelling of Carbon Nanomaterials

MITRE Corporation Student Program – Supervised by [Dr. James Ellenbogen](#)

June 2014 – January 2016

McLean, VA

- Developed and published electrostatics-based model of trends in the quantum capacitance of carbon nanomaterials.

### SEAP Program Selected Student: Plasma Cloud Generation using Cavity Resonators

Naval Research Laboratory – Supervised by Dr. Paul Bernhardt

May – August 2013

Washington D.C.

## PUBLICATIONS

### Sparse Grid Discretizations based on a Discontinuous Galerkin Method

September, 2017

- Preprint to be submitted to *Journal of Classical and Quantum Gravity*, in collaboration with Dr. Erik Schnetter.

### Analytic Formulas for Detachment Energies in Carbon Fullerenes

March, 2017

- Paper published in *Physical Review A*, in collaboration with Dr. James Ellenbogen. ([link](#))

### Representations of a Physical Universe

May 2016, Ongoing

- An open textbook on the ideas of modern mathematical physics, intend to publish through Yale in the fall. ([link](#))

### GalerkinSparseGrids.jl

August 2016

- Julia package implementing efficient method to solve differential equations in higher dimensions. ([link](#))

### 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

- William L. Putnam Mathematics Competition – Top 300
- Morse College Richter Fellow & Yale Dean’s Research Fellow
- United States Physics Olympiad Semifinalist

2016

2016

2013

## SKILLS

**Programming:** C, Julia, Python, Mathematica, Java, Matlab/Octave, HTML/CSS, Excel, R (by experience, most to least)

**Parallel tools:** OpenMP, MPI, CUDA, Tensorflow, Julia toolkit. Strong background in scientific computing and HPC.

**Languages:** English, Bulgarian (native speaker, can read, & write), Latin (read & write, AP and graduate coursework)

**Other:** Strong background in tutoring, public speaking, and academic lecturing. Last but not least, user of  $L^A T_E X$ .