

# John Paul Ryan

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## Curriculum Vitae

### Education

- 2017–present **PhD in Computer Science**, *Cornell University*, Ithaca, NY.  
Concentrating in Scientific Computing, with focus on applications of matrix compression algorithms to the numerical solution of partial differential equations.
- 2012–2016 **BA (Honors) in Mathematics and Computer Science**, *New York University*, New York, *3.86/4.00*.  
Magna Cum Laude, Phi Beta Kappa,  
Math GPA: 3.92, Computer Science GPA: 3.94, Physics (Minor) GPA: 3.92

### Research Experience

- January - August 2017 **Courant Institute**, *Advisor: Miranda Holmes-Cerfon*, New York, NY.  
Designed and implemented an enumeration algorithm for rigid clusters of spheres in two and three dimensions based on fast algorithms for sparse rigidity matrices. Presently performing statistical mechanical analysis of results for publication.
- Summer 2016 **Courant Institute**, *Advisor: Miranda Holmes-Cerfon*, New York, NY.  
Built computer simulations to investigate the dynamics of rolling spheres in a cylindrical dish driven by a circular, periodic motion. Our simulations matched experiments nicely, and allowed us to investigate the sensitivity of the system to parameters such as friction, density, and boundary size.
- August 2015 **Courant Institute**, *Advisor: Chee Yap*, New York, NY.  
Worked on a soft subdivision search algorithm for robot motion planning for disc, triangle, and link robots. Wrote animation in C++ using Qt Creator and OpenGL. See video demonstration on website, under Research.
- June - July 2015 **Auburn REU in Algebra and Discrete Mathematics**, *Advisor: Peter Johnson*, Auburn, AL.  
Spent two months intensively studying algebra and discrete mathematics, especially open and accessible problems. Achieved results in several open problem areas related to abundance indices and integral distance graphs. See publications below.

### Industry Experience

- Summer 2019 **Google**, *Software Engineering Intern*, Cambridge, MA.  
Developed TensorFlow pipelines and accompanying results visualizations and dashboards for a new price prediction model for Google Flights Insights. Also developed several massively parallel processing tools for analysis of price history data.
- Summer 2018 **Google**, *Software Engineering Intern*, Los Angeles, CA.  
Worked on using existing and developing new machine learning tools to improve Google's Ad services. Internship included benchmarking of current technology, implementation of higher performing techniques, and deployment to production.

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## Teaching Experience

Spring 2019	TA for CS4220 and CS4850	<i>Cornell Department of Computer Science</i>
Spring 2017	Grader for Fundamental Algorithms and Data Structures	<i>NYU Department of Computer Science</i>
Fall 2015 - Spring 2016	Department Tutor for Data Structures	<i>NYU Department of Computer Science</i>
Spring 2015 & 2016	cSplash Lecturer	<i>Courant Institute</i>
Spring 2015	Department Tutor for Calculus I-III and Linear Algebra	<i>NYU Department of Mathematics</i>
Fall 2013 & 2014	SAT Preparatory Teacher	<i>Kaplan Test Prep</i>

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## Academic Achievements

- University Fellowship - Cornell Department of Computer Science
- Computer Science Prize for Academic Excellence - NYU Department of Computer Science
- Perley Lenwood Thorne Medal in Mathematics - NYU Department of Mathematics
- Presidential Honors Scholar - NYU College of Arts and Science
- Dean's Honors List (all four years) - NYU College of Arts and Science

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## Publications

- L. Lee, **J. P. Ryan**, Y. Lahini, M. Holmes-Cerfon, and S. M. Rubinstein. "Geometric frustration induces the transition between rotation and counterrotation in swirled granular media." *Physical Review E*, 100-012903, (July, 2019)
- C-H. Hsu, **J. P. Ryan**, and C. Yap, "Path Planning for Simple Robots using Soft Subdivision Search," *Multimedia Exposition Proc. 32nd International Symposium on Computational Geometry*, (June, 2016).
- P. Johnson and **J.P. Ryan**, "Coloring Euclidean Spaces So That All Translates of a Given Set Are Rainbow," *Geombinatorics*, 26 (July 2016), pp. 23-30.
- **J. P. Ryan**, "Coloring Blocks of Consecutive Integers to Forbid Three Distances," *Geombinatorics*, 25 (April, 2016), pp. 168-178.
- E. Jones and **J. P. Ryan**, "Theoretical Friends of Finite Proximity," *International Journal of Mathematics and Computer Science*, 10 (2015), pp. 205-216.

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