

V.S.P. Vijay Bhattiprolu

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Education

- **Ph.D.** In Computer Science (3rd year), **Carnegie Mellon University**, Aug 2014 - (Ongoing).

Advisor: Venkatesan Guruswami.

Research Interests: Approximation, Sum of Squares (Lasserre) Hierarchy, Spectral Algorithms, Complexity Theory.

- **B.Sc.** In Math & CS, University of Illinois at Urbana-Champaign, Aug 2011 - May 2014 (Honors and Highest distinction)

Internships:

- Toyota Technological Institute - Summer 2016. Mentored by Madhur Tulsiani.

Publications and Articles:

- Multiplicative Approximations for Polynomial Optimization over the Unit Sphere. With Mrinalkanti Ghosh, Venkatesan Guruswami, Euiwoong Lee and Madhur Tulsiani. In Submission. <https://arxiv.org/abs/1611.05998>
- Certifying Random Polynomials Over the Sphere via Sum of Squares Hierarchy. With Venkatesan Guruswami and Euiwoong Lee. Manuscript. <https://arxiv.org/abs/1605.00903>
- Approximate Hypergraph Coloring under Low-discrepancy and Related Promises. With Venkatesan Guruswami and Euiwoong Lee. Approx 2015. <http://vspvijay.com/hcup.pdf>
- Separating a Voronoi Diagram via Local Search. With Sariel Har-Peled. SoCG 2016. http://vspvijay.com/s_voronoi.pdf
- Unary Equivalence of Stochastic Grammars and Stochastic Languages. With Mahesh Viswanathan. Manuscript. <http://vspvijay.com/equiv.pdf>

Other Research Projects:

- As part of a research project for a CMU Randomized Algorithms course, developed a near linear time algorithm for graph isomorphism in preferential attachment graphs when the preferential attachment parameter is at least $\text{polylog}(n)$. Manuscript.
- Undergraduate thesis with **Sariel Har-Peled** in relation to Voronoi diagrams and separators. Provided approximation algorithms for inserting a minimal set of points in order to separate a partition of points in the Voronoi diagram. Also gave Local search algorithm for the continuous Geometric Hitting set Problem.
- Undergraduate thesis with **Mahesh Viswanathan** in relation to Parikh equivalence of stochastic grammars and stochastic languages. Proved that every unary stochastic grammar with polynomially bounded ambiguity generates a stochastic language.
- Linear time FPTAS for minimal ball enclosing k geometric sets with Prof. Sariel Har-Peled. Manuscript. Developed an expected linear time FPTAS based on Har-Peled and Raichel's net and prune framework for the problem of finding the minimal ball enclosing k geometric objects from a set of n objects. Further work on quickly approximating the minimal ball intersecting k balls.
- Exponential or polynomial ambiguity of strings in a unary CFG with Prof. Mahesh Viswanathan. Manuscript. Proved that for any unary grammar G , there is a polynomial function P and an exponential function E , such that any string s of length n generated by the grammar has either at most $P(n)$ ambiguous parse trees or at least $E(n)$ ambiguous parse trees.

Awards and Honors:

- **Spring 2014:** Recipient of **C. W. Gear outstanding undergraduate award**.
- **Spring 2013:** Recipient of **James N. Snyder award** for outstanding scholastic achievement.
- **Spring 2012:** Recipient of **P.U.R.E (Promoting Undergraduate Research in Engineering) audience choice award**.
- **Fall 2011 – Spring 2014:** Graduated with **James Scholars Honors and Highest distinction**.