

# Pranjal Vachaspati

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## EDUCATION

### University of Illinois

PhD in Computer Science

*Fall 2014 - Present*

Urbana, IL

**Computer Science:** Algorithms, Parallel Computing, Sparse Numerical Techniques, Phylogenetics, Computational Complexity, Machine Learning, Bioinformatics, Combinatorial Optimization

### MIT

B.S. in Physics

*Class of 2014; 4.2 GPA*

Cambridge, MA

**Computer Science:** Numerical Simulation, Computer Vision, Machine Learning, Computer Architecture, Complexity Theory

**Physics:** Solid State Physics, Junior Lab, Quantum Mechanics, Statistical Mechanics & Thermodynamics, Special Relativity, Electricity and Magnetism

### Princeton University

High School Program

*Jan 2009 - May 2010*

Princeton, NJ

**Computer Science:** Systems Engineering, Algorithms and Data Structures

## PUBLICATIONS

10. P. Vachaspati and T. Warnow. "SVDquest: Improving SVDquartets species tree estimation using exact optimization within a constrained search space". *Molecular Phylogenetics and Evolution*, 2018.
9. P. Vachaspati and T. Warnow. "Enhancing Searches for Optimal Trees Using SIESTA". *RECOMB International Workshop on Comparative Genomics*, 2017
8. S. Christensen, E. Molloy, P. Vachaspati, and T. Warnow. "Optimal Completion of Incomplete Gene Trees in Polynomial Time". *17th International Workshop on Algorithms for Bioinformatics (WABI) 2017*.
7. B.M. Boyd, J.M. Allen, N.P. Nguyen, P. Vachaspati, Z.S. Quicksall, T. Warnow, L. Mugisha, K.P. Johnson, and D.L. Reed. "Primates, Lice, and Bacteria: Speciation and Genome Evolution in the Symbionts of Hominid Lice". *Molecular Biology and Evolution*, 2017.
6. J.M. Allen, B. Boyd, N.P. Nguyen, P. Vachaspati, T. Warnow, D.I. Huang, P.G. Grady, K.C. Bell, Q.C. Cronk, L. Mugisha, and B.R. Pittendrigh. "Phylogenomics from Whole Genome Sequences Using aTRAM". *Systematic biology*, 2017. Vancouver
5. P. Vachaspati and T. Warnow. "FastRFS: Fast and accurate Robinson-Foulds Supertrees using constrained exact optimization", *RECOMB-Comparative Genomics and Bioinformatics*, 2016.
4. P. Vachaspati and T. Warnow. "ASTRID: Accurate Species TREes from Internode Distances", *RECOMB-Comparative Genomics and BMC Genomics*, 2015.

3. R. Davidson, P. Vachaspati, S. Mirarab, and T. Warnow. “Phylogenomic species tree estimation in the presence of incomplete lineage sorting and horizontal gene transfer”, RECOMB-Comparative Genomics, and BMC Genomics, 2015.
2. P. Vachaspati, W. Detmold (2014). “Fast Evaluation of Multi-Hadron Correlation Functions”. LATTICE 2014.
1. S. Li, P. Vachaspati, D. Sheng, N. Dural, M. V. Romalis. “Very large optical rotation generated by Rb vapor in a multi-pass cell”. Phys. Rev. A 84, 061403(R) (2011)

## PRESENTATIONS

6. “Enhancing Searches for Optimal Trees Using SIESTA”. RECOMB International Workshop on Comparative Genomics, 2017, Barcelona, Spain.
5. “FastRFS: Fast and accurate Robinson-Foulds Supertrees using constrained exact optimization”, RECOMB-Comparative Genomics 2016, Montreal, Canada.
4. “ASTRID: Accurate Species TREes from Internode Distances”, Evolution 2016, Austin, TX.
3. “ASTRID: Accurate Species TREes from Internode Distances”, RECOMB-Comparative Genomics 2015, Frankfurt, Germany.
2. “Fast Evaluation of Multi-Hadron Correlation Functions”. LATTICE 2014, New York, NY.
1. “Multi-pass cells for quantum non-demolition Faraday rotation measurements in Rb vapor”, DAMOP 2010, Houston, TX.

## PROFESSIONAL EXPERIENCE

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| <b>University of Illinois at Urbana-Champaign</b>  | Fall 2014-Present       |
| <i>Research Assistant for Professor Tandy Warnow</i>   | Urbana, IL              |
| <ul style="list-style-type: none"> <li>• Designed and evaluated methods for phylogenetic species tree estimation in the presence of various sources of gene tree incongruence</li> </ul>                                 |                         |
| <b>AvaTech</b>   | Summer 2014             |
| <i>Data Consultant</i>   | Cambridge, MA           |
| <ul style="list-style-type: none"> <li>• Developed signal processing techniques to reduce noise in avalanche safety equipment</li> </ul>   |                         |
| <b>Milliman, Inc.</b>  | Summer 2014             |
| <i>Machine Learning Intern</i>   | Cambridge, MA           |
| <ul style="list-style-type: none"> <li>• Analyzed machine learning techniques for life insurance pricing and underwriting</li> </ul>   |                         |
| <b>MIT Center for Theoretical Physics</b>  | Fall 2012 - Summer 2014 |
| <i>Research Assistant for Professor Will Detmold</i>   | Cambridge, MA           |
| <ul style="list-style-type: none"> <li>• Developed lattice quantum chromodynamics simulations on CPUs and GPUs</li> <li>• Designed efficient evaluation strategies for computing multi-hadronic wavefunctions</li> </ul> |                         |
| <b>Discovery Engine</b>  | Summer 2011             |
| <i>Software Development Intern</i>   | San Francisco, CA       |
| <ul style="list-style-type: none"> <li>• Developed infrastructure for general purpose web search and large-scale data manipulation, network filesystems, and compiler tools.</li> </ul>                                  |                         |

- Gained expertise in distributed systems, tools for working on large projects, and API design

**Princeton University Department of Physics** Summer 2008 - Summer 2010  
*Research Assistant for Professor Michael Romalis* Princeton, NJ

- Investigated the use of optical multipass cells to improve the sensitivity of atomic magnetometers

## AWARDS AND RECOGNITION

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| <b>Graduate Research Fellowship</b>                                      | 2016-2021  |
| <i>National Science Foundation</i>                                       | <b>Ira and Debra Cohen Fellow</b> 2015-2016      |
| <i>University of Illinois at Urbana-Champaign College of Engineering</i> | Urbana, IL <b>Saburo Muroga Fellow</b> 2015-2016 |
| <i>University of Illinois at Urbana-Champaign College of Engineering</i> | Urbana, IL <b>Roy J. Carver Fellow</b> 2014-2015 |
| <i>University of Illinois at Urbana-Champaign College of Engineering</i> | Urbana, IL                                       |

## SKILLS

**Languages:** C++, C, Python, Javascript, CSS, HTML, Go, Mathematica, MATLAB, Java, Haskell, Lex, Yacc, L<sup>A</sup>T<sub>E</sub>X, English, Hindi

**Tools:** Emacs, Git, Linux/Bash, GCC, GDB, GNU Make, Eclipse

Last Updated April 7, 2018.

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