

Troy Lee

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Education

- **University of Amsterdam**, 2002–2006
PhD received January 11, 2006
Advisor: Harry Buhrman
- **University of Amsterdam**, 2000–2001
Master of Science in Logic
- **California Institute of Technology**, 1996–2000
Bachelor of Science in Mathematics with Honors.

Postdoctoral Fellowships

- **Columbia University**, 2008–2009
- **Rutgers University**, 2007–2008
- **LRI, Université Paris-Sud**, 2006–2007

Awards

- National Science Foundation Mathematical Sciences Postdoctoral Research Fellowship, 2007–2009
- Netherlands Organisation for Scientific Research Rubicon Postdoctoral Fellowship, 2006–2007
- Papers invited to the special issue of Conference on Computational Complexity in 2004, 2005, 2008, and special issue of Mathematical Foundations of Computer Science, 2004.
- Netherlands-America Fellowship, 2000–2001
- Research Fellowship, Center for the Neural Basis of Cognition, 1999
- Caltech Summer Undergraduate Research Fellowship, 1998
- Robert C. Byrd Scholarship, 1996–1999

Publications

- T. Lee, A. Shraibman. Lower bounds via geometric methods. Survey article in preparation.
- T. Lee, S. Zhang. Composition theorems via XOR lemmas. Manuscript.
- T. Lee, R. Mittal, M. Szegedy. Product rules for semidefinite programming. Submitted.
- T. Lee, G. Schechtman, A. Shraibman. Lower bounds on multiparty quantum communication complexity. Submitted.
- T. Lee, A. Shraibman. An approximation algorithm for approximation rank. Technical report: arXiv:0809.2093.
- T. Lee, R. Mittal. Product theorems via semidefinite programming. In Proceedings of the 35th annual International Colloquium on Automata, Languages, and Programming: 674:685, 2008.
- A. Childs, T. Lee. Optimal quantum adversary lower bounds for ordered search. In Proceedings of the 35th annual International Colloquium on Automata, Languages, and Programming: 869:880, 2008.
- T. Lee, A. Shraibman. Disjointness is hard in the multiparty number-on-the-forehead model. In Proceedings of the 23rd Annual Conference on Computational Complexity: 81–91, 2008.
- T. Lee, A. Shraibman, R. Špalek. A direct product theorem for discrepancy. In Proceedings of the 23rd Annual Conference on Computational Complexity: 71–80, 2008.
- P. Høyer, T. Lee, R. Špalek. Negative weights make adversaries stronger. In Proceedings of the 39th Annual ACM Symposium on Theory of Computing: 526–535, 2007.
- T. Lee. A new rank technique for formula size lower bounds. In Proceedings of the 24th Annual Symposium on Theoretical Aspects of Computer Science. Lecture Notes in Computer Science, vol. 4393:145–156, 2007.
- P. Høyer, T. Lee, R. Špalek. Tight adversary bounds for composite functions. Technical report quant-ph/0509067.
- T. Lee. *Kolmogorov Complexity and Formula Size Lower Bounds*. Ph.D. Thesis, University of Amsterdam, 2006.
- L. Fortnow, T. Lee, N. Vereshchagin. Kolmogorov complexity with error. In *Proceedings of the 23rd Symposium on Theoretical Aspects of Computer Science*. Lecture notes in computer science volume 3884, pages 137–148, 2006.
- S. Laplante, T. Lee, M. Szegedy. The quantum adversary method and classical formula size lower bounds. *Computational Complexity*, 15(2):163–196, 2006. Special issue of papers from Conference on Computational Complexity, 2005.
- T. Lee, A. Romashchenko. On polynomial time bounded symmetry of information. *Theoretical Computer Science*, 345:2-3, pages 386–405, 2005. Special issue of selected papers from the 29th Symposium on the Mathematical Foundations of Computer Science, 2004.

- H. Buhrman, T. Lee, D. van Melkebeek. Language compression and pseudorandom generators. *Computational Complexity*, 14, pages 247–274, 2005. Special issue of selected papers from the 19th Annual IEEE Conference on Computational Complexity, 2004.
- T. Lee. *Arithmetical definability over finite structures*. Mathematical Logic Quarterly 49(4):385–392, 2003.
- V. Tereshko, T. Lee. *How information-mapping patterns determine foraging behaviour of a honey bee colony*. Open Systems and Information Dynamics 9:1–13, 2002.

Research Positions

- Center for the Neural Basis of Cognition, Pittsburgh, Pennsylvania, Summer 1999. Sponsor: Carson Chow
- Cambridge University, Department of Applied Mathematics and Theoretical Physics, Cambridge, England, Summer 1998. Sponsor: Valery Tereshko
- Caltech Seismological Laboratory, Pasadena, California, Summer 1997. Sponsor: Egill Hauks-son

Teaching

- Kolmogorov Complexity 2003 and 2004, University of Amsterdam, Teaching Assistant

Refereeing

- Journals: Algorithmica, Computational Complexity, Mathematical Logic Quarterly, Theory of Computing
- Various conferences such as: Foundations of Computer Science, Symposium on Theory of Computing, Conference on Computational Complexity, Foundations of Software Technology and Theoretical Computer Science, International Colloquium on Automata, Languages and Programming

Research Talks

- Approximation norms and communication complexity lower bounds. University of Tokyo, November 25, 2008, Columbia University, September 26, 2008, Dagstuhl workshop, September 17, 2008.
- Optimal quantum adversary bounds for ordered search. Workshop on quantum algorithms and complexity theory, Singapore, November 17, 2008, ICALP 2008, July 11, 2008.
- Disjointness is hard in the number-on-the-forehead model. Conference on Computational Complexity, June 23, 2008, CWI, May 26, 2008, University of Orsay, May 20, 2008, New

York University, March 13, 2008, Institute for Advanced Study, March 3, 2008, DIMACS theory seminar, January 30, 2008.

- Product theorems via semidefinite programming. Tel Aviv University, April 8, 2008.
- A direct product theorem for discrepancy. Conference on Computational Complexity, June 23, 2008, Dagstuhl seminar, October 9, 2007. DIMACS theory seminar, October 17, 2007. University of Waterloo, November 26, 2007.
- Negative weights make adversaries stronger. DIMACS theory seminar, September 12, 2007, University of Calgary, November 1, 2006. QIP 2007, Brisbane, Australia February 1, 2007. STOC 2007, San Diego, California, June 13, 2007.
- A new rank method for formula size lower bounds. Dagstuhl seminar, November 9, 2006. STACS 2007, Aachen, Germany, February 22, 2007.
- Matrix methods for formula size lower bounds. University of Porto, May 30, 2006.
- Kolmogorov complexity with error. STACS 2006, February 23, 2006.
- Quantum adversary method and classical formula size lower bounds. CWI seminar, April 12, 2005. Conference on Computational Complexity, San Jose, California, June 11, 2005.
- Resource bounded symmetry of information. Dagstuhl seminar on Algebraic methods in computational complexity, October 15, 2004; 29th International Symposium on Mathematical Foundations of Computer Science, Prague, Czech Republic, August 23, 2004.
- Language compression and pseudorandom generators. Seminar at University of Aarhus, Denmark, September 28, 2004; 19th Annual Conference on Computational Complexity, Amherst, Massachusetts, June 21, 2004; Dagstuhl seminar on Complexity of Boolean functions, April 1, 2004.
- Approximate counting and compression. Dagstuhl Centennial seminar on Kolmogorov complexity and applications, April 29, 2004.
- Arithmetical definability over finite structures. Seminar at University of Paris 12, Paris, France, October 21, 2002.
- Is Multiplication Harder than Addition? Tbilisi Symposium on Language, Logic, and Computation, Borjomi, Georgia, September 27, 2001