

## Erik Winfree

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and

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Born: 26 September 1969, Chicago, USA

Citizenship: USA

**Objective** Understanding algorithmic principles in biological systems.

### Academic Positions

09/99–present *California Institute of Technology.*

**Assistant Professor in Computer Science and  
Computation & Neural Systems.**

12/99–6/00 *Massachusetts Institute of Technology. Visiting Scientist in Computer Science.*

10/98–12/99 *Princeton University. Lewis Thomas Postdoctoral Fellow in Molecular Biology.*

### Education

09/92–06/98 *California Institute of Technology.*

**PhD in Computation and Neural Systems (CNS).**

Thesis advisor: John Hopfield. Title: *Algorithmic Self-Assembly of DNA.*

09/87–06/91 *University of Chicago. BS with Honors, Mathematics with spec. in Computer Science.*

01/89–06/89 *Budapest Technological Institute, Hungary. Budapest Semesters in Mathematics.*

### Selected Journal Publications

- Thomas H. LaBean, Hao Yan, Jens Kopatsch, Furong Liu, Erik Winfree, John H. Reif, Nadrian C. Seeman. “Construction, analysis, ligation, and self-assembly of DNA triple crossover complexes.” *Journal of the American Chemical Society*, 122(9): 1848-1860, 2000.
- Sam Roweis, Erik Winfree. “On the reduction of errors in DNA computation.” *Journal of Computational Biology*, 6(1): 65–75, 1999.
- Leonard M. Adleman, Paul W. K. Rothmund, Sam Roweis, Erik Winfree. “On Applying Molecular Computation to the Data Encryption Standard.” *Journal of Computational Biology*, 6(1): 53–63, 1999.
- Sam Roweis, Erik Winfree, Richard Burgoyne, Nickolas V. Chelyapov, Myron F. Goodman, Paul W. K. Rothmund, Leonard M. Adleman. “A Sticker-Based Model for DNA Computation.” *Journal of Computational Biology*, 5(4): 615–629, 1998.
- Erik Winfree, Furong Liu, Lisa A. Wenzler, Nadrian C. Seeman. “Design and Self-Assembly of Two-Dimensional DNA Crystals.” *Nature*, 394: 539–544, 1998.

### Selected Conference Publications

- Erik Winfree, Tony Eng, and Grzegorz Rozenberg. “String Tile Models for DNA Computing by Self-Assembly.” In *Proceedings of the Sixth Annual Meeting on DNA Based Computers, held at Leiden University, June 13-17, 2000.*
- Paul W. K. Rothmund, Erik Winfree. “The Program-Size Complexity of Self-Assembled Squares.” *Symposium on Theory of Computing*, May 21-23, 2000.
- Erik Winfree. “Simulations of Computing by Self-Assembly.” In *Proceedings of the Fourth Annual Meeting on DNA Based Computers, held at the University of Pennsylvania, June 16-19, 1998.*
- Erik Winfree. “Whiplash PCR for  $O(1)$  Computing.” *ibid.*
- Erik Winfree, Xiaoping Yang, Nadrian C. Seeman. “Universal Computation via Self-assembly of DNA: Some Theory and Experiments.” In *DNA Based Computers II: DIMACS Workshop, June 10-12, 1996* (Volume 44 in DIMACS). Laura F. Landweber and Eric B. Baum, editors. American Mathematical Society, 1998. pp. 191–213.
- Erik Winfree. “On the Computational Power of DNA Annealing and Ligation.” In *DNA Based Computers: Proceedings of a DIMACS Workshop, April 4, 1995, Princeton University* (Volume 27 in DIMACS). Richard J. Lipton and Eric B. Baum, editors. American Mathematical Society, 1996. pp. 187–198.

### Books

- Erik Winfree and David K. Gifford (eds.), *DNA-Based Computers V*, American Mathematical Society Press, 2000 (to appear).
- Laura F. Landweber and Erik Winfree (eds.), *Evolution as Computation*, Springer Verlag, 2000 (to appear).

### Selected Talks

- “Synthetic Transcriptional Networks and Neural Networks.” The Machine Learning Conference (Snowbird, Utah), April, 2000.
- “Algorithmic Self-Assembly of DNA.” **Invited talk**, Workshop on Mathematical Problems in the Molecular Sciences, The Courant Institute of Mathematical Sciences, NYU, October, 1999; also given at MIT, February, 2000; Boston University, February, 2000.
- “Controlling Errors in Computation by DNA Self-Assembly.” Agora Meeting on Fluctuations in Biological Systems (Sweden), August, 1999; and Boston University, February, 2000.
- “DNA Computing and Self-assembly.” **Invited talk** given at University of Electro-Communications, University of Saitama, University of Tokyo, and RIKEN Institute, April 1997, Japan.

### Awards, Recognition, and Service

- MacArthur Fellow (2000)
- NAE Frontiers of Engineering Symposium participant (2000)
- MIT’s Technology Review Mag. TR100 Award: “top 100 young innovators” (1999)
- Advisory Board, Springer-Verlag Series on Natural Computing
- Program Committee, Sixth Conference on DNA-Based Computers (Leiden, 2000)
- Program Committee, RECOMB 2000 (Tokyo, 2000)
- Co-organizer, Fifth Annual Conference on DNA-Based Computers (MIT, 1999)
- Co-organizer, DIMACS Workshop on Evolution as Computation (Princeton, 1999)
- Panelist, NIH BECON Nanoscience and Nanotechnology: Shaping Biomedical Research (2000)
- Participant in DARPA Bio-Computation and Engineering Bio-Systems Workshop (2000)
- Participant in DOE Complex and Collective Phenomena Workshop (1999)
- Participant in DARPA UltraScale Computing Workshop (1998)
- Participant in NSF DNA/Biomolecular Computing Workshop (1996)
- Caltech Distinguished Teaching Assistant award (1997)
- Ranked in top 150 four times, Putnam Mathematical Competition (1987–1990)