

**David Yu Zhang**  
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## **Experience:**

- Oct 2007 – present: Safety officer for Winfree Group, California Institute of Technology (Caltech). In charge of waste management, safety protocols and trainings, instrument maintenance, etc.
- Oct 2005 – present: Graduate student in Winfree Group, Caltech. Research in bio-molecular computation and engineering.
- Oct 2004 – Sep 2005: Research visitor in Turberfield Group, Clarendon Laboratory, Oxford University. Research in condensed matter physics.
- Apr 2001 – Jun 2004: Research student in Winfree Group, Caltech. Research in bio-molecular computation and engineering.
- Jan 2001 – Mar 2001: Teaching assistant (TA) for Introductory Computer Science Course (CS 2), California Institute of Technology.
- Jun 2000 – Dec 2000: Research student in Psaltis Group, Caltech. Research in applied optics and holography.

## **Academic Background:**

Ph.D., Computational Neural Systems, California Institute of Technology, exp. 2009.  
B.S., Biology, California Institute of Technology, 2005.

## **Advanced Coursework:**

Genetics, Biochemistry, Immunology, Genetics Laboratory, Gene Expression, Comparative Nervous Systems, Bioinformatics, Molecular Genetics Laboratory, Neurobiology, Developmental Biology, Vertebrate Evolution, Virology;

Computation Theory, Computer Algorithms, Electronics Laboratory, Complex Analysis, Bio-molecular Computation, Statistics, Computer Networking, Signals and Transforms, Neural Networks, Error-Correcting Codes, Information Theory, Advanced Information and Coding Theory;

Options, Economics of Uncertainty and Information, Business Cycles, Theory of Value, Organization Design.

## **Awards:**

2006 – Fannie and John Hertz Foundation Fellow  
2004 – Caltech Grubstake Grant (\$50K)  
2000 – Caltech Axline Full Tuition Merit Scholarship  
2000 – US National Chemistry Olympiad Camp Finalist  
1999 – Research Science Institute Scholar  
1996 – National Mathcounts, 2<sup>nd</sup> Place in the United States

## Selected Publications:

- **Zhang, David Y\***; Winfree, Erik. "Dynamic Allosteric Control of Non-covalent DNA Catalysis Reactions." *Journal of the American Chemical Society* (accepted)
- **Zhang, David Y\***; Schulman, Rebecca; Cook, Matthew; Winfree, Erik. "Noisy Asynchronous Density Classification with Probabilistic One-Dimensional Block Cellular Automata." (submitted)
- **Zhang, David Y\***; Turberfield, Andrew J; Yurke, Bernard; Winfree, Erik. "Engineering Entropy-Driven Reactions and Networks Catalyzed by DNA." *Science* 318: 1121-1125 (2007).
- Seelig, Georg; Soloveichik, David; **Zhang, David Y**; Winfree, Erik. "Enzyme-Free Nucleic Acid Logic Circuits." *Science* 314: 1585-1588 (2006).
- Schoenmeyr, Tor and **Zhang, David Y\***. "FFT-based Algorithms for the String Matching with Mismatches Problem." *J. Algorithms* 57(2): 130-139 (2005).

## Patents:

- **Zhang, David Y**; Winfree, Erik. "Enzyme-Free Method for Following Concentration Dynamics of Nucleic Acids." US provisional patent filed Dec 2007. Non-provisional patent pending.
- **Zhang, David Y**; Turberfield, Andrew J; Yurke, Bernard; Winfree, Erik. "Versatile Entropy-Driven DNA Catalyst and Applications." US provisional patent filed Feb 2007. US non-provisional patent pending.
- Seelig, Georg; Soloveichik, David; **Zhang, David Y**; Winfree, Erik. "Enzyme-Free DNA Logic Gates and Circuits." US non-provisional patent number 60/701,750 (pending). Filed 21 July 2006.
- **Zhang, David Y**; Yurke, Bernard; Winfree, Erik. "Enzyme-Free DNA Amplifier," US non-provisional patent number 11/009,386 (pending), Patent Cooperation Treaty number US2004/041199. Filed 9 December 2004.

**Miscellaneous:** United States Citizen; fluent in speaking, reading and writing Mandarin Chinese; fluent in C and C++.

## References:

Erik Winfree, Associate Professor of Computer Science and Computational Neural Systems, California Institute of Technology. Ph.D. thesis advisor and undergraduate research advisor. [winfree@caltech.edu](mailto:winfree@caltech.edu)

Andrew Turberfield, Professor of Physics, University of Oxford (United Kingdom). Research advisor. [a.turberfield@physics.ox.ac.uk](mailto:a.turberfield@physics.ox.ac.uk)

Bernard Yurke, Professor of Material Science and Engineering, Boise State University. Research collaborator. [BernardYurke@boisestate.edu](mailto:BernardYurke@boisestate.edu)

Georg Seelig, CBCD Postdoctoral Researcher, California Institute of Technology. Research collaborator. [seelig@dna.caltech.edu](mailto:seelig@dna.caltech.edu)