

# Zeph Grunschlag

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New York, NY 10027  
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RESEARCH INTERESTS Protein-protein interaction networks, educational software in computer science, algorithms in group theory, geometric group theory, formal language theory, cryptography.

EDUCATION

- ◇ **PhD in Mathematics, 1999**  
University of California, Berkeley  
Advisor: Dr. John Stallings  
Dissertation: *Algorithms in geometric group theory*
- ◇ **AB in Mathematics, 1992**  
Princeton University  
Magna Cum Laude  
Senior Thesis: *Complex representations of  $SL(2, K)$  for finite fields  $K$*

PROFESSIONAL EXPERIENCE

Columbia University, New York. Assistant Professor of Computer Science, since Fall 1999.

IBM Research Center, Haifa, Israel. Visiting Research Scientist, Summer 2000.

University of California, Berkeley, Mathematics Department. Graduate Student Instructor and Graduate Student Researcher, Spring 1993 to Spring 1999.

Princeton University, Princeton, NJ. Undergraduate Teaching Assistant, Introduction to Programming in C, Spring 1990.

PUBLICATIONS

Deciding if the Angle is Zero in Free Groups, *Topology and its Applications*, no. 110 (2001), Elsevier Science, Amsterdam.

Computing Angles in Hyperbolic Groups, pp. 59–88 in *Groups, Languages and Geometry*, R. Gilman Ed., Contemporary Mathematics no. 250, American Mathematical Society, Providence R.I., 1999.

*Algorithms in Geometric Group Theory*, Dissertation, Berkeley, CA, 1999.  
<http://www1.cs.columbia.edu/~zeph/papers.html#thesis>

LECTURE NOTES

- ◇ **Cryptography**: <http://www1.cs.columbia.edu/~zeph/4261/lectures/>
- ◇ **Computability**: <http://www1.cs.columbia.edu/~zeph/3261/lectures.html>
- ◇ **Discrete Mathematics**: <http://www1.cs.columbia.edu/~zeph/3203s04/lectures.html>

AWARDS

- ◇ **Erdosz Fellow** 1999, Technion University, Israel (Declined the Fellowship Award)
- ◇ **National Need Fellow**, 1993, University of California, Berkeley
- ◇ **Phi Beta Kappa**, 1992, Princeton University

SKILLS

- ◇ C++, Java, Matlab, PHP, Regular Expressions, Google Maps, Javascript, HTML,  $\text{\LaTeX}$ , GAP, OPL
- ◇ Fluent in English and Hebrew

TEACHING   ◇ **Courses Taught at Columbia**

- Data Structures and Algorithm Analysis in C++  
Covers both abstract design and practical implementation issues in C++  
Honors and regular sections taught
- Data Structures in Java  
Covers both abstract design and practical implementation issues in Java  
Honors and regular sections taught
- Introduction to Cryptography  
Covers the theoretical underpinning of cryptography and cryptanalysis  
Graduate level
- Undergraduate Cryptography  
Covers classical and modern encryption and cryptanalysis algorithms both theoretically and through Java implementations
- Computer Science Theory  
Covers regular expressions, context free grammars, Turing completeness, undecidable and intractable problems  
Final theory course required by all undergraduate C.S. majors
- Discrete Mathematics and Graph Theory  
Covers logic, proofs, probability, combinatorics, and graphs.  
First C.S. theory course

◇ **Courses Taught at U.C. Berkeley**

- Calculus II, U.C. Berkeley Math Dept., Summer 1997
- Architecture student calculus workshop director, U.C. Berkeley Architecture Dept., 1995–1996.
- Teaching Assistant: Abstract Algebra, Discrete Mathematics, Linear Algebra, Calculus II, Calculus I, Pre-Calculus, 1993–1998.

EDUCATION   ◇ **stateGraphSearch**: PHP graph search visualizer using Google maps of the 50 states  
SOFTWARE    <http://www.cs.columbia.edu/~zeph/maps>

Technologies: C++, PHP, HTML, Javascript, Google Maps API

◇ **webcrypt**: web-based cryptology learning system

<http://www1.cs.columbia.edu/~zeph/software/webcrypt>

Technologies: Java, Swing, HTML

◇ **cfgrep**: context free grammar `egrep` variant

<http://www1.cs.columbia.edu/~zeph/software/cfgrep>

Technology: Java

◇ **JavaCFG**: visual parse tree generator for general context free grammars

<http://www1.cs.columbia.edu/~zeph/software/JavaCFG>

Technologies: Java, Swing

◇ **JavaGrades**: student grades website and personalized email generator

<http://www1.cs.columbia.edu/~zeph/software/JavaGrades>

Technologies: Java, XML, HTML

- INDEPENDENT STUDY Finkel, Jenny. Experimental Evidence for the Hanna Neumann Conjecture, Spring 2001.  
Lyubashevsky, Vadim. First Implementations of Geometric Group Theory Algorithms, Spring 2001.  
Chou, Ching-En and Wu, Jiunn-Ru. Topics in Complexity Theory, Fall 2001.  
LaShanda Henry, Kabir Ahuja, Sage Choi, Jason Lee and Olga Zaitseva. Weaver and the Web, Fall 2001 and Spring 2002.  
Ordonez, Ramiro. Implementations of Fast Matrix Multiplication Algorithms, Fall 2002.  
Yeung, Alan. Block Cipher Cryptanalysis, Fall 2003.
- STUDENT PROJECTS John E. Cao, Jing Fan, Jing Huang, Shen Li, Yiting Shen and Simin Wang. ABCEZ: Applet Based Computability Enlightenment Zone, Fall 2000.  
Hirsch, Yoav. Grammar Transformation Addition to JavaCFG, Spring 2002.  
Dweck., B. J. Graph Based Turing Machine Simulator, Fall 2003.  
Mungekar, Surag. Automaton Addition to Turing Machine Simulator, Spring 2004.  
Larivierre, David. Javascript Runtime Encryptor, Spring 2004.
- COMMITTEES AND SERVICE ◇ **Columbia Video Network Computer Science Liaison.** Fall 2000 - current.  
◇ **Columbia Video Network Computer Science Advisor.** Fall 2000 - current.  
◇ **Masters Program Committee.** Fall 2001 - current.  
◇ **Masters Admissions Committee.** Fall 2001 - current.  
◇ **Masters Student Advisor.** Fall 2001 - current.  
◇ **Senior Engineering Student Advisor.** Fall 2000 and Spring 2001.  
◇ **Junior Engineering Student Advisor.** Fall 1999 and Spring 2000.
- INVITED TALKS *Connections between formal languages and hyperbolic groups*, Colloquium, Vanderbilt Math Dept., Nashville, TN, 7 April, 1999.  
*The importance of computer science in group theory (or what happened when Rubik read Hopcroft and Ullman)*, Colloquium, Columbia C.S. Dept., New York, NY, 25 March, 1999.  
*Computing angles in hyperbolic groups*, Albany Group Theory Conference, Albany, NY, 11 October, 1998.
- PROFESSIONAL ACTIVITIES Referee, Proceeding of the AMS, Geometric Methods in Group Theory, 2003  
Book Reviewer, Brooks/Cole, 2003  
Referee, International Journal of Algebra and Computation, 2001
- REFERENCES Available upon request