

EUGENE DAVYDOV

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EDUCATION

Stanford University, Stanford, CA (2001-present)

- Working towards a **PhD in Computer Science** with distinction in teaching, expected completion spring 2009
- Thesis topic: Algorithms for Comparison and Analysis of Multiple Related Genomic Sequences
- Thesis advisor: Serafim Batzoglou
- NIGMS training grant recipient, 2002-2005

Stanford University, Stanford, CA (1997-2001)

- **MS in Computer Science** with concentration in Theory conferred in June 2001
- **BS in Mathematics** with distinction conferred in June 2001
- Graduate GPA = 4.12 , Undergraduate GPA = 3.82

SPECIFIC BACKGROUND

Computer Science

- Extensive programming experience in C and C++, familiar with many other languages (Java, Perl, etc)
- Research and advanced coursework experience in:
 - Algorithms (exact, approximation and heuristic algorithms; optimization algorithms; randomized algorithms; graph, tree, string, and sequence algorithms; geometric algorithms; online algorithms)
 - Artificial Intelligence (logic, probabilistic reasoning and probabilistic models such as Bayesian networks and Hidden Markov Models, machine learning)
 - Computational Biology (DNA and protein sequence alignment, gene recognition, constrained element detection, RNA alignment and folding)
- Coursework in cryptography, operating systems, compilers, computer systems, networks, databases, graphics

Mathematics

- Probability and statistics, linear and multilinear algebra, single and multi-variable calculus, real and complex analysis, differential geometry, modern algebra, ordinary differential equations, number theory, combinatorics

Biology

- Genetics (including population genetics), molecular evolution, biochemistry, molecular and cell biology

AWARDS AND ACCOMPLISHMENTS

- TopCoder (handle evd)
 - Semifinalist – TC Collegiate Challenge 2002 and 2003
 - Quarterfinalist – TC Invitational 2001, TC Open 2003 and 2005, and TC Collegiate Challenge 2005
 - Peak rating 2493, peak rank #10 (99.6 percentile)
 - 15 room wins; highest scorer in Division I in Single Round Match 77
- ACM Pacific NW Regional Contest team third place, 2000
- Putnam Competition team honorable mention, 1998; individual top 200, 1997-1999
- Stanford University President's Scholar, 1997-2001
- CS106A graphics contest winner and CS106B sorting contest winner, 1998

WORK EXPERIENCE

Research Assistant, Stanford University, Stanford, CA (2002-present)

- Studied algorithms and computational approaches for analyzing large amounts of genomic data
- Developed a graph model for analyzing complexity of RNA multiple structural alignment and designed an approximation algorithm for this problem
- Developed and implemented a fast and statistically rigorous method for finding constrained elements in mammalian genomic alignments

Instructor, Stanford University, Stanford, CA (summer 2004)

- Taught a summer course on algorithms and data structures (CS161) to a class of approximately 35 students based on the CLRS textbook and additional topics such as skip lists
- Prepared and delivered three 75-minute lectures per week
- Designed six problem sets, two exams, and a programming project

Teaching Assistant, Stanford University, Stanford, CA (9 courses from 2000 to present)

- Graded and assisted with preparing homework, exams, and programming projects; answered questions by email and during office hours; taught section; maintained course websites
- Delivered substitute lectures on HMM learning (2/2/09) and phylogenetic trees/molecular evolution (2/18/09)

Mathware Engineer, Mathstar Inc, Minneapolis, MN (summer 2001)

- Developed models for channel noise and distortion of transmitted signals and studied adaptive equalization techniques used in high-speed telecommunications

Research Associate, Medtronic Inc, Minneapolis, MN (summer 1999)

- Developed and implemented an adaptive algorithm for implantable devices to maintain and update a template for discriminating normal and tachycardic signal morphologies in real time
- Wrote Perl scripts to automate algorithm testing and performance evaluation on real patient data
- Designed and implemented a data compression scheme to reduce memory usage in devices

PATENTS

Koyrakh L, **Davydov E**, Gillberg J, Cao J. Automated template generation algorithm for implantable device. US Patent #7062315, awarded June 2006.

Koyrakh L, **Davydov E**, Gillberg J. Automated template generation algorithm for implantable device. US Patent #6745068, awarded June 2004.

PUBLICATIONS

Davydov E, Cooper GM, Goode DL, Sidow A, Batzoglou S. A fast and statistically robust method for position-specific constraint score estimation and element prediction. In preparation.

Goode DL, et al. Functional genetic variation in humans is dominated by ancient and common noncoding polymorphisms. In preparation.

The ENCODE Project Consortium. Identification and analysis of functional elements in 1% of the human genome by the ENCODE pilot project. *Nature* 447: 799-816, 2007.

Davydov E, Batzoglou S. A computational model for RNA multiple structural alignment. *Theoretical Computer Science* 368(3):205-216, 2006.

Davydov E, Batzoglou S. A computational model for RNA multiple structural alignment. *Proceedings of Combinatorial Pattern Matching*, 2004.

Brudno M, Do C, Cooper GM, Kim MF, **Davydov E**, NISC Comparative Sequencing Program, Green ED, Sidow A, Batzoglou S. LAGAN and Multi-LAGAN: Efficient tools for large-scale multiple alignment of genomic DNA. *Genome Research* 13: 721-731, 2003.