

# NEVA CHERNIAVSKY

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## RESEARCH INTERESTS

I am broadly interested in creating effective yet theoretically sound algorithms to solve practical problems. My areas of expertise include machine learning, compression and signal processing, human computer interaction, multimedia, and auction theory.

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## EDUCATION

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| 2004-Present | Ph.D. candidate in Computer Science, expected 2009<br><b>University of Washington</b> , Seattle, WA<br>Thesis: Activity Analysis of Sign Language Video<br>Advisors: Richard Ladner and Eve Riskin |
| 2002-2004    | M.S. in Computer Science<br><b>University of Washington</b> , Seattle, WA<br>Thesis: Grammar-based Compression of DNA Sequences<br>Advisor: Richard Ladner   |
| 1997-2001    | B.S. in Computer Science and Mathematics (summa cum laude)<br><b>Tufts University</b> , Medford, MA  |

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## RESEARCH EXPERIENCE

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| 2006-Present | <b>MobileASL</b> : Compressing sign language video to enable deaf users to communicate via mobile phone. My work focuses on automatically recognizing activity specific to sign language video, such as turn-taking and finger spelling, and adjusting parameters in real-time to save power and bits while preserving intelligibility. |
| 2005-2006    | <b>Multimedia</b> : Broadcasting compressed variable bit rate movies to satisfy video-on-demand. Casting this problem as a version of generalized windows scheduling, we achieved low delay with a practical and efficient algorithm.   |
| 2005         | <b>MultiStage</b> : Compressing video to obtain constant quality at a target average bit rate. We mapped the problem of bit allocation to the multiple choice knapsack problem and implemented our solution inside H.264, the newest standard for video compression.  |
| 2004-2005    | <b>Auction Theory</b> : Selling items to impatient bidders. We proved bounds on the competitiveness of deterministic and randomized algorithms compared with the optimal offline solution.  |

2002-2004     **DNASequitur**: Compressing DNA sequences. We applied an elegant, linear time grammar compression algorithm that creates a unique grammar for the DNA sequence.

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## PUBLICATIONS

N. Cherniavsky, R. E. Ladner, and E. A. Riskin. Activity Detection in Conversational Sign Language Video for Mobile Telecommunication. To appear in IEEE Int'l Conference on Automatic Face and Gesture Recognition, Sept 2008.

N. Cherniavsky, A. C. Cavender, R. E. Ladner, and E. A. Riskin. Variable Frame Rate for Low Power Mobile Sign Language Communication. In ASSETS '07: Proceedings of the Ninth International ACM SIGACCESS Conference on Computers and Accessibility, pages 163-170, Oct 2007.

N. Cherniavsky, G. Shavit, M. F. Ringenburt, R. E. Ladner, and E. A. Riskin. MultiStage: A MINMAX Bit Allocation Algorithm for Video Coders. *IEEE Transactions on Circuits and Systems for Video Technology* volume 17, number 1, pages 59-67, Jan 2007.

N. Bansal, N. Cherniavsky, N. Chen, A. Rudra, B. Scheiber and M. Sviridenko. Dynamic Pricing for Impatient Bidders. In Symposium on Discrete Algorithms (SODA), pages 726-735, Jan 2007.

N. Cherniavsky and R. E. Ladner. Practical Low Delay Broadcast of Compressed Variable Bit Rate Movies. In Data Compression Conference (DCC), pages 362-371, Mar 2006.

N. Cherniavsky and R. E. Ladner. Grammar-based compression of DNA Sequences. UW CSE Technical Report (TR2007-05-02), presented at the DIMACS Working Group on the Burrows-Wheeler Transform, Aug 2004.

M.J. McAuliffe, D.P. McGarry, W. Gandler, N. Cherniavsky, D.A. Parsons, H.J. Singh, and B.L. Trus. Medical Image Processing, Analysis, and Visualization. Poster presented at the National Institutes of Health Research Festival, Oct 2000.

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## TEACHING EXPERIENCE

Summer 2006     **Instructor, Data Structures**: I served as the sole instructor for a 28 student class consisting of computer science majors, supervising one teaching assistant. I taught three weekly lectures, combining previous material with original work; held office hours; prepared a new project, including a new code base with visualization; wrote and graded exams; answered student questions via a newsgroup and private email; and maintained the course website with up-to-date lecture materials and assignments.

Spring 2005     **Teaching Assistant, Professional Masters Program Algorithms**: Duties included communicating with the (all off-campus) students over email, answering questions on the message board, writing solutions to homework problems, holding office hours, and grading assignments and exams.

Winter 2005     **Teaching Assistant, Graduate Algorithms**: Duties included website maintenance, providing extra help in office hours, and grading assignments and exams.

- Autumn 2004    **Teaching Assistant, *Introduction to Computer Science***: I taught two different hour-long weekly sessions, each containing about 30 students. My duties also included holding office hours for individual help and grading assignments and exams.
- Spring 2004    **Teaching Assistant, *Discrete Structures***: I taught a weekly hour-long session attended by around 30 students. I had great leeway to teach what I thought was interesting and relevant. My duties also included holding office hours for individual help and grading assignments and exams.
- Winter 2004    **Teaching Assistant, *Data Compression***: Duties included website maintenance, providing extra help in office hours, grading assignments and exams, writing solutions to assignments, and setting up and maintaining project code.
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## WORK EXPERIENCE

- 1998-2002    **National Institutes of Health, Bethesda, MD**: Important member of a programming team that is developing a general-purpose image-processing product to support research in the NIH intramural program. The MIPAV (Medical Image Processing, Analysis, and Visualization) application enables quantitative analysis and visualization of medical images to support NIH scientists and physicians. Java software modules implemented include:
- Automated image registration technique used in a variety of physician research, such as Alzheimer's studies and stroke detection and treatment.
  - Surface visualization tool for modeling structures found in medical images.
  - Interactive, semi-automatic "intelligent scissors" tool for delineating objects of special interest, such as tumors.
  - Reusable graph component used in the analysis of image data. Major graph attributes include: zooming, auto scaling, resizing, and multiple function display.
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## HONORS

- 2007            UW SWE Outstanding Female Graduate Award in CSE
- 2002-2005    NSF Graduate Research Fellowship
- 2002            Phi Beta Kappa, Tufts University
- 2001            Benjamin Brown Scholarship, Tufts University
- 1998            Dean's Prize for Academic Excellence, Tufts University
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## SERVICE

- 2005-Present    Tutor, CSE undergraduates
- 2008            Reviewer, IEEE Transactions on Image Processing

2007	Reviewer, EURASIP Journal on Bioinformatics and Systems Biology
2006-2007	Graduate student seminar coordinator
2006	Reviewer, IEEE Transactions on Broadcasting
2006	Editor for disabilities office: translated mathematics portions of textbooks into Latex to make them accessible to blind students
2005-2006	CSE graduate student coordinator: served as the liaison between the faculty and the graduate students
2005-2006	Graduate admissions committee
2004-2005	Graduate and Professional Student senator
2004-2006	Mentor for Making Connections, a program that matches disadvantaged high school women with successful mentors