

# Adrian Corduneanu

## Education

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### Massachusetts Institute of Technology

Ph.D. candidate in Computer Science

Thesis supervisor: Prof. Tommi Jaakkola

Minor: Business Administration at Sloan School of Management

### Massachusetts Institute of Technology

M.Sc., January 2002

Thesis: Stable Mixing of Complete and Incomplete Information

Thesis supervisor: Prof. Tommi Jaakkola

### University of Toronto

B.Sc. in Computer Science and Mathematics, May 1999

With High Distinction, Dean's List Scholar

## Fellowships and Awards

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### Awards

- 2003 • **Best Paper Award**, 19<sup>th</sup> Conference on Uncertainty in Artificial Intelligence
- 1999 • Word Finalist, ACM Programming Competition, Eindhoven, The Netherlands
- 1997 • **Outstanding Winner**, 13<sup>th</sup> Mathematical Contest in Modeling
- 1996 • **Gold Medal**, 37<sup>th</sup> International Mathematical Olympiad, Bombay, India
- 1995 • Silver Medal, 36<sup>th</sup> International Mathematical Olympiad, Toronto, Canada
- 1993 • Silver Medal, 10<sup>th</sup> Balkan Mathematical Olympiad, Nicosia, Cyprus

### Fellowships

- 1999, 2002 • **NSERC Canadian Fellowship** for Graduate Research
- 2000 • Presidential Fellowship, Massachusetts Institute of Technology
- 1996–1999 • **National Scholarship**, University of Toronto
- 1996–1999 • George Roderick Fraser Scholarship in Mathematics, University of Toronto
- 1997, 1998 • Galois Award in Mathematics, University of Toronto
- 1997, 1998 • University of Toronto Scholar, University of Toronto
- 1998 • Samuel Beatty Award in Computer Science and Mathematics, Univ. of Toronto
- 1998 • Dr. James A. & Connie P. Dickson Scholarship in the Sciences and Mathematics, University of Toronto
- 1996 • Tes Mossman Admission Scholarship, University of Toronto

## Research and Industrial Positions

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- Summer 2004 Research Intern, Microsoft Research Redmond, WA  
Advisor: Dr. John Platt
  - Designed a novel robust real-time algorithm for super-resolution of images that enhances the resolution of text while being robust on other type of detail. Applications include scalable UI's, real-time zooming of web interfaces, enhancing low-resolution camera images of documents, or web graphics for printing.

## Research and Industrial Positions (contd.)

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- Summer 2003      Research Intern, Microsoft Research      Redmond, WA  
Advisors: Dr. Hagai Attias and Dr. Eric Brill
- Developed an entertaining conversational agent that extracts correct and coherent English replies from the Internet in real-time, trained with machine learning techniques to recognize dialog. The demo was highly regarded.
- 9/2002–5/2003      Visiting Researcher, University of Toronto      Toronto, Canada  
Advisor: Prof. Brendan Frey
- Collaborated with a biology lab to deliver statistical algorithms for denoising microarray data.
- Summer 2001      Research Intern, Microsoft Research      Redmond, WA  
Advisor: Dr. Chris Meek
- Implemented a discriminative algorithm for classification with Bayesian networks with application to handwritten character recognition of Japanese.
- Summer 2000      Research Intern, Microsoft Research      Cambridge, UK  
Advisor: Dr. Christopher Bishop
- Developed and published a Variational Bayes algorithm for automatically determining the number of components in a mixture of Gaussians model.
- Summer 1999      Software Design Engineer, Microsoft Corporation      Redmond, WA
- Designed and developed a statistical code-optimization tool that reorders C++ structures to minimize the number of cache misses. The tool, trained on the memory access pattern from sample runs, scored 1% benchmarked speed improvement on MS SQL Server (**US patent #6678805**).
- Summer 1998      Visiting Scientist, Johns Hopkins University      Baltimore, MD  
Advisor: Prof. Vassilis Digalakis
- Developed an algorithm for adaptation of a speech recognition system to new speakers from a very short sample of speech that increased speech recognition accuracy by 1%.

## Other Research

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- 9/2003–5/2004      Research Assistant, MIT      Cambridge, MA  
Advisor: Prof. Tommi Jaakkola
- Pioneered a new class of algorithms for classification with labeled and unlabeled data based on the *information regularization* principle.
  - Designed and implemented a Hidden Markov Model that produces a compact representation of classes of genomic binding motifs.
- 9/2001–8/2002      Research Assistant, MIT      Cambridge, MA  
Advisor: Prof. Tommi Jaakkola
- Introduced *homotopy continuation* methods to the machine learning community, with application to learning from labeled and unlabeled data.
- 9/1998–6/1999      Research Collaboration, Johns Hopkins University — University of Toronto  
Advisors: Prof. F. Jelinek, Prof. S. Khudampur, and Prof. G. Hirst
- Implemented and published a large-vocabulary language model that predicts the next word from long histories clustered with a decision tree (10,000 lines of C++ code)

## Teaching Experience

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- Fall 2004            Recitation Instructor, Massachusetts Institute of Technology            Cambridge, MA  
Course: Machine Learning (first-year graduate core class)  
• Taught supplementary material in recitations, organized group grading sessions, supervised students on their final project.
- Spring 1999            Recitation Instructor, University of Toronto            Toronto, Canada  
Course: Software Tools and Systems Programming (sophomore core class)  
• Conducted recitations, supervised laboratory sessions and examinations.
- 9/1996–5/1999        Recitation Instructor, University of Toronto            Toronto, Canada  
(6 semesters)        Course: Calculus (freshman core class)  
• Conducted recitations and individual tutoring sessions, administered weekly quizzes.

## Publications

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### Refereed Conference Papers

- ▷ Corduneanu, A. and Platt, J. C. (2005)  
Learning Spatially-Variable Filters for Super-Resolution of Text  
Submitted to the *IEEE International Conference on Image Processing 2005*
- ▷ Corduneanu, A. and Jaakkola, T. (2004)  
Distributed Information Regularization on Graphs  
In *Neural Information Processing Systems 2004*
- ▷ Corduneanu, A. and Jaakkola, T. (2003)  
On Information Regularization  
In *Uncertainty in Artificial Intelligence 2003*, **Best Paper Award**
- ▷ Corduneanu, A. and Jaakkola, T. (2002)  
Continuation Methods for Mixing Heterogeneous Sources  
In *Uncertainty in Artificial Intelligence 2002*
- ▷ Corduneanu, A. and Bishop, C. (2001)  
Variational Bayesian Model Selection for Mixture Distributions  
*AI and Statistics 2001*
- ▷ Corduneanu, A. (1999)  
A Pylonic Decision-Tree Language Model with Optimal Question Selection  
*Proceedings of the 37th Annual Meeting, Association for Computational Linguistics*
- ▷ Bocchieri, E., Digalakis, V., Corduneanu, A., Boulis, C. (1999)  
Correlation Modeling of MLLR Transform Biases for Rapid HMM Adaptation to New Speakers  
*Proceedings of ICAASP 1999*
- ▷ Digalakis, V., Corduneanu, A., et al. (1999)  
Rapid Speech Recognizer Adaptation to New Speakers  
*Proceedings of the ICAASP 1999*

### Journal Articles

- ▷ Corduneanu, A., Hsia, C., and O'Donnell, R. (1997)  
A Greedy Algorithm for Solving Meeting Mixing Problems  
*The UMAP Journal*

### Master Thesis

- ▷ Corduneanu, A. (2001) Stable Mixing of Complete and Incomplete Information.

## Technical Reports

- ▷ Zatloukal, K., Corduneanu, A., Ladner, R., Grover, V., Meacham, S. (1999)  
Improving Cache Performance by Structure Reordering  
Technical Report from 1999 Microsoft internship

## Peer Reviewing

IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)  
International Workshop on Artificial Intelligence and Statistics

## Professional Presentations

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10/2004	<i>PHZ Capital Partners</i> Compact Characterization of Binding Sites via Hidden Markov Models	Wayland, MA
8/2004	<i>Microsoft Research</i> Adaptive Filtering for Real-Time Superresolution of Text	Redmond, WA
4/2004	<i>Stochastic Systems Group</i> Large-scale Information Regularization and Extensions	Massachusetts Institute of Technology
8/2003	<i>Microsoft Research</i> Internet-Powered Chat Agent	Redmond, WA
8/2003	19 <sup>th</sup> <i>Conference on Uncertainty in Artificial Intelligence</i> On Information Regularization	Acapulco, Mexico
10/2002	<i>Stochastic Systems Group</i> Continuation Methods for Mixing Heterogeneous Sources of Information	Massachusetts Institute of Technology
11/2002	<i>Probability and Statistical Inference Group</i> Continuation Methods for Mixing Heterogeneous Sources of Information	University of Toronto
8/2002	18 <sup>th</sup> <i>Conference on Uncertainty in Artificial Intelligence</i> Continuation Methods for Mixing Heterogeneous Sources	Edmonton, Canada
1/2001	8 <sup>th</sup> <i>International Workshop on Artificial Intelligence and Statistics</i> Variational Bayesian Model Selection for Mixture Distributions	Key West
8/2000	<i>Microsoft Research UK</i> Discrete Model Selection With Continuous Hyperparameters	Cambridge, UK
7/1999	37 <sup>th</sup> <i>Annual Meeting of the Association for Computational Linguistics</i> A Decision-Tree Language Model	
8/1998	<i>The Center for Language and Speech Processing</i> Correlation Modeling for Bias Adaptation	Johns Hopkins University
4/1998	<i>Mathematical Association of America Regional Meeting</i> 1997 Mathematical Contest in Modeling: A Meeting Mixing Problem	Toronto, Canada

## Programming Skills

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Expert C++, Perl, Matlab, C#, Java, L<sup>A</sup>T<sub>E</sub>X, Linux and Windows programming

## References

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Available upon request