

## Hugo Larochelle

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## Education

- **University of Toronto** Since 2009  
Postdoc, working with Prof. Geoffrey Hinton Toronto, ON Canada
- **University of Montreal** 2004 - 2009  
Ph.D., Computer Science Montreal, QC Canada
- **University of Montreal** 2001 - 2004  
B.S., Mathematics and Computer Science (GPA 4.3) Montreal, QC Canada
- **Cégep de Saint-Hyacinthe** 1999 - 2001  
Diplôme Collégial, Sciences Pures Saint-Hyacinthe, QC Canada

## Work History

- **Researcher** October 2008 - March 2009  
*ApSTAT Technologies* Montréal, QC Canada, H2W 2R2  
<http://www.apstat.com/>
  - participated to the research project *Statistical Machine Learning Algorithms for Target Classification from Acoustic Signature*, conducted by *ApSTAT Technologies* and led by Prof. Yoshua Bengio
  - investigated and developed machine learning algorithms for the classification of acoustic sound waves
- **Research Intern** May 2003 - August 2003  
and May 2004 - August 2004  
Laboratoire d'Informatique des Systèmes Adaptatifs (LISA) Montreal, QC Canada
  - designed and investigated different machine learning algorithms
  - contributed to PLearn, a machine learning library in C++ (<http://plearn.berlios.de/>)
- **Research Intern** May 2002 - August 2002  
Laboratoire de Recherche Appliquée en Linguistique Informatique (RALI) Montreal, QC Canada
  - designed a terminology extraction software in Java
  - conducted an empirical study of different statistical metrics for term identification

## Scholarships and Awards

- NSERC Postdoctoral Fellowship, 2009 (80 000\$ over two years)
- Thesis ranked among the top 5% best theses of University of Montreal, 2009
- NSERC Canada Graduate Scholarship Ph.D., 2005 (105 000\$ over three years)
- NSERC Canada Graduate Scholarship M.S., 2004 (17 500\$)
- Scholarship for “passage direct au doctorat”, University of Montreal, 2004 (10 000\$)
- NSERC Undergraduate Student Research Award, 2004 (5625\$)
- NSERC Undergraduate Student Research Award, 2003 (5625\$)
- NSERC Undergraduate Student Research Award, 2002 (5625\$)
- University of Montreal's Dean Scholarship, 2003 (2000\$)

- University of Montreal's Dean Scholarship, 2002 (2000\$)
- Third position at MITACS poster competition of Second Canada-France Congress, 2008
- CAE-Fraser Scholarship, 2003 (2000\$)
- University of Montreal Welcoming Scholarship, 2001 (2000\$)
- Governor General's Bronze Academic Medal, 1999

## Publications

- **Thesis**
  - **Études de techniques d'apprentissage non-supervisé pour l'amélioration de l'entraînement supervisé de modèles connexionnistes**  
Hugo Larochelle,  
Ph.D. Thesis, Université de Montréal, 2009
- **Journal publications**
  - **Detonation Classification from Acoustic Signature with the Restricted Boltzmann Machine**  
Yoshua Bengio, Nicolas Chapados, Olivier Delalleau, Hugo Larochelle, Xavier Saint-Mleux, Christian Hudon and Jérôme Louradour,  
To appear in Computational Intelligence, 2011
  - **Stacked Denoising Autoencoders : learning useful representations in a deep network with a local denoising criterion**  
Pascal Vincent, Hugo Larochelle, Isabelle Lajoie, Yoshua Bengio and Pierre-Antoine Manzagol,  
Journal of Machine Learning Research, Vol.11, pp.3371-3408, 2010
  - **Tractable Multivariate Binary Density Estimation and the Restricted Boltzmann Forest**  
Hugo Larochelle, Yoshua Bengio and Joseph Turian,  
Neural Computation, Vol.22, pp.2285-2307, 2010
  - **Exploring Strategies for Training Deep Neural Networks**  
Hugo Larochelle, Yoshua Bengio, Jérôme Louradour and Pascal Lamblin,  
Journal of Machine Learning Research, Vol.10, pp.1-40, 2009
  - **Non-Local Estimation of Manifold Structure**  
Yoshua Bengio, Martin Monperrus and Hugo Larochelle,  
Neural Computation, Vol.18, pp.2509-2528, 2006
- **Conference publications**
  - **Learning Attentional Policies for Tracking and Recognition in Video with Deep Networks**  
Loris Bazzani, Nando de Freitas, Hugo Larochelle, Vittorio Murino and Jo-Anne Ting,  
To appear in Proceedings of the 28th Annual International Conference on Machine Learning (ICML 2011), 2011  
Bellevue, USA
  - **The Neural Autoregressive Distribution Estimator**  
Hugo Larochelle and Iain Murray,  
To appear in Proceedings of the International Conference on Artificial Intelligence and Statistics (AISTATS 2011), 2011  
Accepted as an oral, **Notable Paper Award** (2% of submissions)
  - **Learning to combine foveal glimpses with a third-order Boltzmann machine**  
Hugo Larochelle and Geoffrey Hinton,  
Advances in Neural Information Processing Systems 23 (NIPS23), pp.1243-1251, 2010  
Accepted as an oral (2% of submissions)  
Vancouver, Canada

- **Efficient Learning of Deep Boltzmann Machines**  
Ruslan Salakhutdinov and Hugo Larochelle,  
Proceedings of the International Conference on Artificial Intelligence and Statistics (AISTATS 2010), pp.693-700, 2010  
Sardinia, Italy
- **Deep Learning using Robust Interdependent Codes**  
Hugo Larochelle, Dumitru Erhan and Pascal Vincent,  
Proceedings of the International Conference on Artificial Intelligence and Statistics (AISTATS 2009), pp.312-319, 2009  
Clearwater Beach, USA
- **Classification using Discriminative Restricted Boltzmann Machines**  
Hugo Larochelle and Yoshua Bengio,  
Proceedings of the 25th Annual International Conference on Machine Learning (ICML 2008), pp.536-543, 2008  
Helsinki, Finland
- **Extracting and Composing Robust Features with Denoising Autoencoders**  
Pascal Vincent, Hugo Larochelle, Yoshua Bengio and Pierre-Antoine Manzagol,  
Proceedings of the 25th Annual International Conference on Machine Learning (ICML 2008), pp.1096-1103, 2008  
Helsinki, Finland
- **Zero-data Learning of New Tasks**  
Hugo Larochelle, Dumitru Erhan and Yoshua Bengio,  
Proceedings of the Twenty-Third AAAI Conference on Artificial Intelligence (AAAI 2008), pp.646-651, 2008  
Chicago, USA
- **An Empirical Evaluation of Deep Architectures on Problems with Many Factors of Variation**  
Hugo Larochelle, Dumitru Erhan, Aaron Courville, James Bergstra and Yoshua Bengio,  
Proceedings of the 24th Annual International Conference on Machine Learning (ICML 2007), pp.473-480, 2007  
Corvallis, USA
- **Greedy Layer-Wise Training of Deep Networks**  
Yoshua Bengio, Pascal Lamblin, Dan Popovici and Hugo Larochelle,  
Advances in Neural Information Processing Systems 19 (NIPS19), pp.153-160, 2007  
Accepted as an oral (3% of submissions)  
Vancouver, Canada
- **Non-Local Manifold Parzen Windows**  
Yoshua Bengio, Hugo Larochelle and Pascal Vincent,  
Advances in Neural Information Processing Systems 18 (NIPS18), pp.115-122, 2006  
Vancouver, Canada
- **Non-Refereed contributions**
  - **Generalization to a zero-data task : an empirical study**  
Hugo Larochelle, Dumitru Erhan and Yoshua Bengio,  
Talk at Learning Workshop, 2007  
Puerto Rico, USA

- **Distributed Representation Prediction for Generalization to New Words**  
Hugo Larochelle and Yoshua Bengio  
Technical report, Université de Montréal, 2006
- **Implantation and analyse d’un modèle graphique de désambiguïsation à entraînement supervisé, semi-supervisé and non-supervisé**  
Hugo Larochelle and Yoshua Bengio  
Research project, Université de Montréal, 2003
- **Some Supervised Models in Disambiguation**  
Hugo Larochelle, Christian Jauvin and Yoshua Bengio  
Poster presented at MITACS “Échanges Québec”, 2003  
Montréal, Canada
- **Étude de la pertinence de métriques statistiques pour la détection de termes dans un document**  
Hugo Larochelle and Philippe Langlais  
Technical report, Université de Montréal, 2002

## Other research-related contributions

- I have reviewed for the following journals/conferences : JMLR, IJCV, IEEE-TNN, COST, IJPRAI, NIPS2008, ICML2009, NIPS2009, AISTATS2010, ICML2010, AISTATS2011, IJCAI2011, ICML2011, UAI2011.
- In May 2010, I was invited to give a talk at Université Paris-Sud, in France.
- In March 2010, I gave a tutorial on deep neural networks at University Laval. The tutorial lasted 9 hours, spread on two days.
- In April 2006, I gave a tutorial on the application of neural networks to natural language processing (NLP) problems, as part of the RALI-OLST seminars, at University of Montreal.
- I co-organized the **Deep Learning Workshop**, held as a satellite meeting at the NIPS Conference 2007. For more details, see <http://www.iro.umontreal.ca/~lisa/deepNIPS2007>.
- I was teaching assistant for the course **IFT6266 Algorithmes d'apprentissage** given by Prof. Douglas Eck during 2007 fall semester at University of Montreal. I participated to the elaboration of the course's content, taught one class on the basic mathematics required for the course, wrote and corrected the student assignments and interacted with the students during planned office hours.
- I was teaching assistant for the course **IFT3395/6390 Fondements de l'apprentissage machine** given by Prof. Pascal Vincent during the 2007 winter semester at University of Montreal. My responsibilities included teaching during weekly practical sessions, writing and correcting assignments, as well as being available during office hours to answer the students' questions.
- I co-created the **UdeM-McGill-MITACS Machine Learning Seminars** with Doina Precup, professor at McGill University. This seminar series hosts talks from students and professors in Montreal as well as renowned invited speakers in the field of machine learning.
- From 2009 to Fall of 2010, I was in charge of the Machine Learning Seminars at University of Toronto.

## Skills

**Languages :** Python, C++, C, Java, Matlab, HTML, L<sup>A</sup>T<sub>E</sub>X, Scheme, Prolog, BASH shell scripting, CSH shell scripting

**Applications and Libraries :** Mercurial, SVN, CVS, PLearn, LAPACK, BLAS

**Miscellaneous :** Speaks English and French