

Nicolas Le Roux

✉ nicolas@le-roux.name

🏠 nicolas.le-roux.name

Education and experience

- 2010–... **Postdoctoral researcher**, *INRIA*, Paris, France.
- 2010 **Visiting researcher**, *New-York University*, USA.
- 2008–2010 **Postdoctoral researcher**, *Microsoft Research*, Cambridge, UK.
Probabilistic models of images, optimization.
- 2004–2008 **PhD in machine learning**, *University of Montreal*, Canada.
Theoretical advances on the representation and optimization of neural networks.
- 2002–2003 **Master's degree**, *École Normale Supérieure de Cachan*, France.
Maths, Vision and Artificial Intelligence.
- 2000–2003 **Engineer diploma (5 years of college)**, *École Centrale Paris*, France.
Applied mathematics.

Miscellaneous

- 2011 **Coorganizer of the NIPS Workshop on Deep Learning**.
- 2005–2011 **Reviewer for NIPS, ICML, AISTATS, CVPR, JMLR, Neural Comp., PNAS**.

Awards, scholarships and achievements

- 2010 **CIFAR Junior Fellowship**, *University of British Columbia*, Canada.
Two years, 50000\$/year. Declined.
- 2008–2010 **Microsoft Research Fellowship**, *Darwin College*, Cambridge, UK.
- 2008 **PhD excellence**, *University of Montreal*, Canada.
PhD dissertation elected amongst the best 5% of the discipline
- 2007 **Arctic 2007**, Canada and Alaska.
3800-mile bike trip to raise awareness about climate change (<http://www.arctic2007.org>).

Teaching experience

- 2010 & 2011 **Neural networks; Optimization methods**, *École Normale Supérieure*, 3 hours.
Graduate course “Object recognition and computer vision”
- 2011/3 **Deep Belief Networks**, *SMILE Seminar*, Paris, France, 6 hours.
- 2009/5 **Gradient Descent and other Optimization Methods**, *Gatsby unit*, 3 hours.
Graduate course “Machine Learning II”
- 2005 **Teacher assistant for the graduate course “Learning algorithms”**, *University of Montreal*.
- 2004 **Teacher at the Panda-Club**, *Lycée Janson-de-Sailly*, Paris, France.
Helping students of sixth grade who encounter studying difficulties
- 2001–2002 **Advanced maths examiner**, *Lycée Fénelon*, Paris, France.

Publications

- [1] Nicolas Le Roux and Francis Bach. Local component analysis. Technical Report arXiv:1109.0093v3, INRIA, 2011.
- [2] Mark Schmidt, Nicolas Le Roux, and Francis Bach. Convergence rates of inexact proximal-gradient methods for convex optimization. In *Advances in Neural Information Processing Systems 24*, 2012.
- [3] Y-Lan Boureau, Nicolas Le Roux, Francis Bach, Jean Ponce, and Yann LeCun. Ask the locals: multi-way local pooling for image recognition. In *Proceedings IEEE International Conference on Computer Vision*, 2011.
- [4] Nicolas Le Roux, Yoshua Bengio, and Andrew Fitzgibbon. Improving first and second-order methods by modeling uncertainty. In S. Sra, S. Nowozin, and S.J. Wright, editors, *Optimization for Machine Learning*. MIT Press, 2011.
- [5] Nicolas Heess, Nicolas Le Roux, and John Winn. Weakly supervised learning of foreground-background segmentation using masked RBMs. In T. Honkela, W. Duch, M.A. Girolami, and S. Kaski, editors, *ICANN 2011 - Proceedings, Part II*, volume 6792 of *Lecture Notes in Computer Science*. Springer, 2011.
- [6] Nicolas Le Roux, Nicolas Heess, Jamie Shotton, and John Winn. Learning a generative model of images by factoring appearance and shape. *Neural Computation*, 23(3):593–650, 2011.
- [7] Nicolas Le Roux and Andrew Fitzgibbon. A fast natural Newton method. In *Proceedings of ICML 2010*, 2010.
- [8] Nicolas Le Roux and Yoshua Bengio. Deep belief networks are compact universal approximators. *Neural Computation*, 22(8):2192–2207, 2010.
- [9] Nicolas Le Roux. *Avancées théoriques sur la représentation et l'optimisation des réseaux de neurones*. PhD thesis, University of Montreal, 2008.
- [10] Nicolas Le Roux, Yoshua Bengio, and Balázs Kégl. Learning the 2-D topology of images. In J.C. Platt and D. Koller and Y. Singer and S. Roweis, editor, *Advances in Neural Information Processing Systems 20*, pages 841–848. MIT Press, 2008.
- [11] Nicolas Le Roux, Pierre-Antoine Manzagol, and Yoshua Bengio. Topmoumoute online natural gradient algorithm. In J.C. Platt, D. Koller, Y. Singer, and S. Roweis, editors, *Advances in Neural Information Processing Systems 20*, pages 849–856. MIT Press, 2008.
- [12] Nicolas Le Roux and Yoshua Bengio. Representational power of restricted Boltzmann Machines and Deep Belief Networks. *Neural Computation*, 20:6:1631–1649, 2008.
- [13] Nicolas Le Roux and Yoshua Bengio. Continuous neural networks. In *Proceedings of the Eleventh International Conference on Artificial Intelligence and Statistics*, 2007.
- [14] Yoshua Bengio, Olivier Delalleau, and Nicolas Le Roux. The curse of highly variable functions for local kernel machines. In J.C. Platt, Y. Weiss, and B. Schölkopf, editors, *Advances in Neural Information Processing Systems 18*, pages 107–114. MIT Press, 2006.
- [15] Yoshua Bengio, Olivier Delalleau, Nicolas Le Roux, Jean-François Paiement, Pascal Vincent, and Marie Ouimet. Spectral dimensionality reduction. In I. Guyon, S. Gunn, M. Nikravesh, and L. Zadeh, editors, *Feature Extraction, Foundations and Applications*. Springer, 2006.
- [16] Olivier Delalleau, Yoshua Bengio, and Nicolas Le Roux. Large-scale algorithms. In O. Chapelle, B. Schölkopf, and A. Zien, editors, *Semi-Supervised Learning*, pages 333–341. MIT Press, 2006.
- [17] Yoshua Bengio, Olivier Delalleau, and Nicolas Le Roux. Label propagation and quadratic criterion. In O. Chapelle, B. Schölkopf, and A. Zien, editors, *Semi-Supervised Learning*, pages 193–216. MIT Press, 2006.

- [18] Yoshua Bengio, Nicolas Le Roux, Pascal Vincent, Olivier Delalleau, and Patrice Marcotte. Convex neural networks. In J.C. Platt, Y. Weiss, and B. Schölkopf, editors, *Advances in Neural Information Processing Systems 18*, pages 123–130. MIT Press, 2006.
- [19] Olivier Delalleau, Yoshua Bengio, and Nicolas Le Roux. Efficient non-parametric function induction in semi-supervised learning. In *Proceedings of the Tenth International Workshop on Artificial Intelligence and Statistics*, pages 96–103, 2005.
- [20] Yoshua Bengio, Jean-François Paiement, Pascal Vincent, Olivier Delalleau, Nicolas Le Roux, and Marie Ouimet. Out-of-sample extensions for LLE, Isomap, MDS, Eigenmaps, and Spectral Clustering. In S. Thrun, L. Saul, and B. Schölkopf, editors, *Advances in Neural Information Processing Systems 16*. MIT Press, 2004.
- [21] Yoshua Bengio, Olivier Delalleau, Nicolas Le Roux, Jean-François Paiement, Pascal Vincent, and Marie Ouimet. Learning eigenfunctions links spectral embedding and kernel PCA. *Neural Computation*, 16(10):2197–2219, 2004.