

# ROLAND MEMISEVIC

## CURRICULUM VITAE

---

### EDUCATION .....

**Computer Science, PhD** Sep. 2003 – Mar. 2008  
University of Toronto, Department of Computer Science  
Adviser: Prof. Geoffrey Hinton  
Thesis title: *Non-linear latent factor models for revealing structure in high-dimensional data.*

**Computer Science, Diplom (with distinction)** Apr. 1997 – Apr. 2003  
German equivalent of combined B.Sc./M.Sc.  
Department of Computer Science, Bielefeld University, Bielefeld/Germany.  
Advisers: Prof. Helge Ritter and Dr. Peter Meinicke  
Thesis title: *Unsupervised Kernel Regression for Nonlinear Dimensionality Reduction.*

### PROFESSIONAL EXPERIENCE .....

**Twenty Billion Neurons GmbH** since June 2016  
Co-founder and Chief Scientist

**Department of Computer Science and Operations Research,  
University of Montreal, Canada (on leave since June 2016)** Since September 2012  
Assistant Professor at the MILA machine learning institute

**Department of Computer Science, University of Frankfurt** Jan. 2011 – Aug. 2012  
Juniorprofessor

**Department of Computer Science, ETH Zürich, Switzerland** Jan. 2010 – Dec. 2010  
Postdoctoral fellow

**PNYLab LLC, Princeton, USA** Jul. 2008 – Dec. 2009  
Research scientist

**Department of Computer Science, University of Toronto, Canada** Jan. 2008 – Jun. 2008  
Postdoctoral fellow

**Microsoft Research, Redmond, USA** Jun. 2007 – Sep. 2007  
Research intern

**Department of Computer Science, Bielefeld University, Germany** Apr. 2003 – Oct. 2003  
Research assistant

|  |      |
|--|------|
| PUBLICATIONS .....   |      |
| Lin, Z., Courbariaux M., Memisevic, R., Bengio Y.<br><b>Neural Networks with Few Multiplications</b><br>International Conference on Learning Representations (ICLR 2016)                                   | 2016 |
| Krueger, D., Memisevic, R.<br><b>Regularizing RNNs by Stabilizing Activations</b><br>International Conference on Learning Representations (ICLR 2016)  | 2016 |
| Im, D., Belghazi, M., Memisevic, R.<br><b>Conservativeness of Untied Auto-Encoders</b><br>Thirtieth AAAI Conference on Artificial Intelligence (AAAI 2016)   | 2016 |
| de Vries, H., Memisevic, R., Courville, A.<br><b>Deep Learning Vector Quantization</b><br>European Symposium on Artificial Neural Networks (ESANN 2016)  | 2016 |
| Kamyshanska, H., Memisevic, R.<br><b>The potential energy of an autoencoder</b><br>IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI).  | 2015 |
| Konda, K., Memisevic, R., Krueger, D.<br><b>Zero-bias autoencoders and the benefits of co-adapting features</b><br>International Conference on Learning Representations (ICLR 2015).                       | 2015 |
| Konda, K., Memisevic, R.<br><b>Learning visual odometry with a convolutional network</b><br>International Conference on Computer Vision Theory and Applications (VISAPP 2015).                             | 2015 |
| Jean, S., Cho, K., Memisevic, R., Bengio, Y.<br><b>On using very large target vocabulary for neural machine translation</b><br>Annual meeting of the Association for Computational Linguistics (ACL 2015). | 2015 |
| Konda, K., Chandrasekariah, P., Memisevic, R., Triesch, J.<br><b>Real-time activity recognition via deep learning of motion features</b><br>European Symposium on Artificial Neural Networks (ESANN2015)   | 2015 |
| Michalski V., Memisevic R., Konda K.<br><b>Modeling Deep Temporal Dependencies with Recurrent “Grammar Cells”</b><br>Neural Information Processing Systems (NIPS 2014).                                    | 2014 |
| Konda K., Memisevic, R., Michalski V.<br><b>Learning to encode motion using spatio-temporal synchrony</b><br>International Conference on Representation Learning (ICLR 2014).                              | 2014 |
| Konda K., Memisevic R.<br><b>A unified approach to learning depth and motion features</b><br>Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP 2014).                            | 2014 |
| Memisevic, R.<br><b>Learning to relate images</b><br>IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) Special issue on Learning Deep Architectures 2013.                              | 2013 |
| Kamyshanska, H., Memisevic, R.<br><b>On autoencoder scoring</b><br>International Conference on Machine Learning (ICML 2013).   | 2013 |

- Memisevic, R., Exarchakis, G. 2013  
**Learning invariant features by harnessing the aperture problem**  
International Conference on Machine Learning (ICML 2013).
- Bauer, F., Memisevic, R. 2013  
**Feature grouping from spatially constrained multiplicative interaction**  
International Conference on Representation Learning (ICLR 2013).
- Memisevic, R., Sigal L., Fleet, D. 2012  
**Shared Kernel Information Embedding for Discriminative Inference.**  
IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI).
- Memisevic, R. 2012  
**On multiview feature learning**  
International Conference on Machine Learning (ICML 2012).
- Memisevic, R. 2012  
**On spatio-temporal feature learning**  
The Learning Workshop, Snowbird.
- Memisevic, R. 2011  
**Gradient-based learning of higher-order image features.**  
International Conference on Computer Vision (ICCV 2011).
- Susskind, J., Memisevic, R., Hinton, G., Pollefeys M. 2011  
**Modeling the joint density of two images under a variety of transformations.**  
International Conference on Computer Vision and Pattern Recognition (CVPR 2011).
- Memisevic, R. 2011  
**On spatio-temporal sparse coding: Analysis and an algorithm.**  
NIPS workshop on deep learning and unsupervised feature learning.
- Memisevic, R., Conrad C. 2011  
**Stereopsis via deep learning.**  
NIPS workshop on deep learning and unsupervised feature learning.
- Memisevic, R., Hinton, G. 2010  
**Learning to Represent Spatial Transformations with Factored Higher-Order Boltzmann Machines.**  
Neural Computation. Vol. 22, No. 6: 1473-1492.
- Memisevic, R., Zach, C., Hinton, G., Pollefeys M. 2010  
**Gated Softmax Classification.**  
Neural Information Processing Systems (NIPS 2010).
- Sigal, L., Memisevic, R., Fleet, D. 2009  
**Shared Kernel Information Embedding for Discriminative Inference.**  
International Conference on Computer Vision and Pattern Recognition (CVPR) 2009.
- Memisevic, R., Hinton, G. E. 2007  
**Unsupervised learning of image transformations.**  
International Conference on Computer Vision and Pattern Recognition (CVPR) 2007.
- Samulowitz, H., Memisevic, R. 2007  
**Learning to solve QBF.**  
Twenty-Second Conference on Artificial Intelligence (AAAI) 2007.
- Memisevic, R. 2006  
**Kernel Information Embeddings.**  
International Conference on Machine Learning (ICML) 2006.

Memisevic, R. 2006  
**Propagating Errors and Beliefs for Large Scale Nonlinear Structure Prediction.**  
 North East Student Colloquium on Artificial Intelligence. Ithaca, NY.

Meinicke, P., Klanke, S., Memisevic, R., Ritter, H. 2005  
**Principal Surfaces from Unsupervised Kernel Regression.**  
 IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Sep. 2005.

Memisevic, R. and Hinton, G. E. 2005  
**Improving dimensionality reduction with spectral gradient descent.**  
 Neural Networks, 18, pp 702-710.

Memisevic, R., Srebro N., Roweis, S. 2005  
**Exploring the regularization path for adaptive Gaussian kernel SVMs.**  
 NIPS Workshop on the Accuracy-Regularization Frontier.

Memisevic, R. 2005  
**Dual Optimization of Conditional Probability Models.**  
 NIPS Workshop on Kernel Methods for Structured Domains.

Memisevic, R. and Hinton, G. E. 2005  
**Embedding via clustering: Using spectral information to guide dimensionality reduction.** International Joint Conference on Neural Networks 2005.

Memisevic, R. and Hinton, G. E. 2005  
**Multiple Relational Embedding.**  
 Neural Information Processing Systems (NIPS) 2005.

THESES / NON-REFEREED .....

Memisevic, R. 2008  
**Non-linear latent factor models for revealing structure in high-dimensional data.**  
 PhD Thesis, Department of Computer Science, University of Toronto.

Memisevic, R. 2006  
**An Introduction to Structured Discriminative Learning.**  
 Technical report, University of Toronto.

Memisevic, R. 2003  
**Unsupervised Kernel Regression for Nonlinear Dimensionality Reduction.**  
 Master's thesis, Department of Computer Science, Bielefeld University.

SELECTED TALKS .....

**MIT Deep Learning workshop 2016** Invited talk Boston Jun. 2016

**ICISP 2016** Keynote Trois Rivieres Jun. 2016

**Re-Work Deep Learning Summit 2016** Invited talk San Francisco Jan. 2016

**Data science meetup Berlin** Invited talk Berlin Nov. 2015

**University of Toronto** Invited seminar, CS department Toronto Nov. 2015

**KLA-Tencor** Invited talk Monterey Oct. 2015

**Google** Invited talk Mountain View Oct. 2015

**ICML 2015 workshop on Deep Learning** Invited talk Lille July 2015

|   |                     |
|---|---------------------|
| <b>Universite Laval</b> Invited talk Dept. for Comp. Sci. and Software Engineering  | Quebec Apr. 2015    |
| <b>Data science day</b> Invited talk  | Berlin Oct. 2014    |
| <b>ICLR 2014</b> Keynote  | Banff Apr. 2014     |
| <b>Max-Planck Institute for Biological Cybernetics</b> Invited talk   | Tuebingen Aug. 2011 |
| <b>Learning the meaning of “the same”</b> , University of Basel.  | Basel Aug. 2010     |
| <b>How to train a mixture of 100.000.000.000.000 classifiers.</b> , Univ. of Toronto.   | May 2010            |
| <b>Learning to encode data transformations.</b> , ETH Zürich.   | Sep. 2009           |
| <b>Extrahieren verborgener Strukturen mit latenten Variablen.</b> , TU Darmstadt.   | Sep. 2009           |
| <b>Learning with factorized three-way interactions.</b> , CIFAR workshop on inter-neurons.  | Apr. 2008           |
| <b>Learning the allowable transformations of simple shapes using 3-way interactions.</b> , CIFAR workshop on 'Achieving perceptual invariance'. | Dec. 2007           |
| <b>Building a compact multi-resolution index structure.</b> , Microsoft Research.   | Sep. 2007           |
| <b>Learning with conditional latent variables.</b> , Yahoo! Applied Research Montreal.  | June 2007           |
| <b>Learning with conditional latent variables.</b> , TradeLink Holdings, Chicago.   | May 2007            |
| <b>Unsupervised learning of image transformations.</b> , CIFAR Summer School.   | Aug. 2006           |
| <b>Kernel information embeddings</b> , University of Toronto.   | Sep. 2005           |
| <b>Kernel information embeddings.</b> CIFAR Workshop on Manifold Learning.  | Apr. 2005           |

GRANTS AND AWARDS .....

|  |      |
|--|------|
| <b>FQRNT Team Research Project:</b> Unsupervised deep learning of changes in facial expression 2015<br>≈ \$150,000 CAD four three years. Team leader, with co-PIs Yoshua Bengio, Pascal Vincent, Aaron Courville.      |      |
| <b>DARPA seedling project</b><br>≈ \$180,000 USD for one year for studying Deep Learning based time series models (PI) jointly with Yoshua Bengio (co-PI). Part of a larger project with SRI and University of Guelph. | 2015 |
| <b>Facebook</b><br>\$25,000 USD, gift  | 2014 |
| <b>Google faculty research award</b><br>\$40,800 USD for studying phase-sensitive feature hierarchies.   | 2013 |
| <b>NSERC Discovery Grant</b><br>\$100,000 CAD (\$20,000 per year for five years 2013–2018) Research Grant.   | 2013 |
| <b>NSERC Strategic Grant</b><br>\$575,739 CAD (\$191,913 per year for three years) Strategic Project Grant in collaboration with Ubisoft (jointly with Yoshua Bengio, Pascal Vincent and Aaron Courville)              | 2013 |
| <b>Government of Canada Award</b><br>Funding for the first two years of my PhD program at Toronto (> \$50.000 CAD in total)  | 2003 |

PROFESSIONAL ACTIVITIES .....

*Reviewer* for Swiss National Science Foundation, Journal IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Journal of Machine Learning Research (JMLR), Journal Image and Vision Computing (IMAVIS), Journal Constraint, Journal Machine Learning, IEEE Transactions on Image Processing, International Journal of Adaptive Control and Signal Processing.

*Regular reviewer and/or PC member* ICLR, NIPS, ICML, CVPR, ICCV, ECCV, DAGM

Co-organizer of the CRM/CIFAR Summer School on Deep Learning in Montreal 2015 (with Yoshua Bengio, Yann LeCun)

Co-organizer of the NIPS 2014 workshop on Deep Learning and Representation Learning (with Adam Coates, Yoshua Bengio, Andrew Ng)

Invited tutorial on Deep Learning at *Hotchips* (Cupertino, CA) 2015

Invited tutorial on Deep Learning in Image Processing and Vision at International Conference on Image Processing *ICIP* (Quebec City) 2015

Invited tutorial at Training Workshop on Deep Architectures in Vision and NL (Wroclaw, Poland) 2015

Invited tutorial at the *CIFAR Summer School Neural Computation and Adaptive Perception (NCAP)* Toronto 2013

Tutorial at CVPR 2012: *Multiview feature learning*

Invited tutorial at the *IPAM Graduate Summer School: Deep Learning, Feature Learning* (UCLA) 2012

Invited tutorial at DAGM 2011: *Higher-order feature learning: Building a computer vision “swiss army knife”*

TEACHING .....

|  |                    |
|--|--------------------|
| Instructor, <i>Machine Learning for Vision (IFT 6268)</i><br>University of Montreal                                | Winter 2016        |
| Instructor, <i>Databases (IFT2821)</i><br>University of Montreal   | Winter 2015        |
| Instructor, <i>Machine Learning for Vision (IFT 6268)</i><br>University of Montreal                                | Winter 2015        |
| Instructor, <i>Fundamentals of Machine Learning</i><br>University of Montreal                                      | Fall 2014          |
| Instructor, <i>Machine Learning for Vision (IFT 6268)</i><br>University of Montreal                                | Fall 2013          |
| Instructor, <i>Topics in artificial intelligence (IFT 6085): Visual Feature Learning</i><br>University of Montreal | Winter 2013        |
| Instructor, <i>Machine Learning</i><br>University of Frankfurt   | Winter 2011/12     |
| Instructor, <i>Digital Image Processing</i><br>University of Frankfurt   | Spring 2011        |
| Teaching Assistant, <i>Introduction to Neural Networks and Machine Learning (CSC 321)</i><br>University of Toronto | Spring 06/07       |
| Teaching Assistant, <i>Software Design (CSC 207)</i> , University of Toronto                                       | Summer 2006        |
| Teaching Assistant, <i>Machine Learning (CSC 2515)</i> , University of Toronto                                     | Fall 2005 and 2006 |

Teaching Assistant, *Theoretical Computer Science*, Bielefeld University

Summer 2000

Teaching Assistant, *Methods of Artificial Intelligence*, Bielefeld University

Winter 1999/2000

GRADUATE STUDENTS .....

Zhouhan Lin (PhD student at University of Montreal since 2014)

Vincent Michalski (PhD student at University of Montreal since Fall 2015)

Harm de Vries (PhD student at University of Montreal since 2014) jointly with Aaron Courville

Kyle Kastner (MSc student at University of Montreal since 2014) jointly with Yoshua Bengio

David Krueger (MSc student at University of Montreal since 2013) jointly with Yoshua Bengio

(graduated) Kishore Konda (University of Frankfurt) PhD received 2015

(graduated) Sebastien Jean (University of Montreal) MSc received 2015

(graduated) Vincent Michalski (University of Frankfurt) MSc received 2014

(graduated) Irina Shelegeda (University of Frankfurt) MSc received 2014

(graduated) Hanna Kamyshanska (University of Frankfurt) MSc received 2013

(graduated) Felix Bauer (University of Frankfurt) MSc received 2012