

# Ilja Kuzborskij

---

[ilja.kuzborskij@gmail.com](mailto:ilja.kuzborskij@gmail.com)  
<http://idiap.ch/~ikuzbor>  
Google Scholar [↗](#)  
+39-3290711976

My current research interest is in design and analysis of efficient transfer learning algorithms, in particular applied to deep learning. I am also interested in analysis of non-convex learning problems, algorithmic stability, and nonparametric online learning.

- EDUCATION**
- École polytechnique fédérale de Lausanne (EPFL)** 2012 - Sept 2017 (planned)  
PhD student, Electrical Engineering  
Thesis: *Hypothesis Transfer Learning*  
Advisors: Prof. Barbara Caputo and Prof. Francesco Orabona
- University of Edinburgh** 2010 - 2011  
MSc Artificial Intelligence  
Thesis: *Large-Scale Pattern Mining of Computer Program Source Code*  
Advisor: Prof. Charles Sutton
- EXPERIENCE**
- IST Austria (Scientific Visitor)** Oct 2016 - Apr 2017  
*Data-Dependent Generalization Bounds for Non-convex Problems*  
Advisor: Prof. Christoph Lampert  
Analyzed learning ability of SGD algorithm widely used in deep learning in a data-dependent setting. Derived theory which motivates new transfer learning algorithms, and wrote efficient software to compute top Hessian eigenvalue of deep neural nets.
- EPFL and Idiap Research Institute (PhD student)** Sep 2012 - present  
*Hypothesis Transfer Learning*  
Advisor: Prof. Barbara Caputo and Prof. Francesco Orabona  
Designed and analyzed efficient transfer learning algorithms that can learn much faster by leveraging on auxiliary pre-trained models. Developed new theory that corroborates success of many previous works in the area, and designed novel algorithms that are able to learn efficiently by reusing thousands of auxiliary models. Designed and analyzed online and stochastic locally-linear learning algorithms.
- University of Rome La Sapienza (Research Assistant)** Oct 2014 - present  
*Hypothesis Transfer Learning and Locally-Linear Learning*  
Advisor: Prof. Barbara Caputo  
In collaboration with Prof. Nicolò Cesa-Bianchi designed and analyzed online learning algorithm that learns in rich (nonparametric) environments, and simultaneously reduces curse of dimensionality. Designed and analyzed randomized greedy transfer learning algorithms that can learn faster by leveraging on auxiliary models.

**Toyota Technological Institute as Chicago (Intern)**

Summer 2013

*Hypothesis Transfer Learning*

Supervisor: Prof. Francesco Orabona

Analyzed the family of transfer learning algorithms that learn by reusing auxiliary pre-trained models induced from previous tasks. Identified key quantitative characteristics of relatedness between new and previous tasks, and developed theory explicating this quantity, supporting theoretically many previous works in the literature.

**Idiap Research Institute (Intern)**

Jan 2012 - Sep 2012

*Electromyography Classification with Large Number of Grasps*

Supervisor: Prof. Barbara Caputo

Conducted evaluation on feasibility of recognition of 52 hand grasps from surface electromyography to investigate potential application in robotic hand prosthetics.

**CERN (Intern)**

Summer 2009

Supervisor: Dr. Vincenzo Innocente

Developed a domain-specific information retrieval and natural language-based system for semi-automatic software error resolution used in the CMS experiment.

**PUBLICATIONS**

**Technical Reports**

**I. Kuzborskij** and C. H. Lampert. [Data-Dependent Stability of Stochastic Gradient Descent](#). *arXiv preprint arXiv:1703.01678*, 2017.

**I. Kuzborskij** and N. Cesa-Bianchi. [Nonparametric Online Regression while Learning the Metric](#). *arXiv preprint arXiv:1705.07853*, 2017.

**Journal Papers**

**I. Kuzborskij** and F. Orabona. [Fast Rates by Transferring from Auxiliary Hypotheses](#). *Machine Learning, Springer*, 2017.

**I. Kuzborskij**, F. Orabona, and B. Caputo. [Scalable Greedy Algorithms for Transfer Learning](#). *Computer Vision and Image Understanding, Elsevier*, 2016.

M. Atzori, A. Gijsberts, **I. Kuzborskij**, S. Heynen, A. Mittaz Hager, O. Deriaz, C. Castellini, H. Müller, and B. Caputo. [Characterization of a Benchmark Database for Myoelectric Movement Classification](#). *IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE)*, 2014.

## Peer Reviewed Conferences

**I. Kuzborskij**, F. M. Carlucci, and B. Caputo. [When Naïve Bayes Nearest Neighbors Meet Convolutional Neural Networks](#). In *Computer Vision and Pattern Recognition (CVPR)*, 2016.

**I. Kuzborskij**, B. Caputo, and F. Orabona. [Transfer Learning through Greedy Subset Selection](#). In *International Conference on Image Analysis and Processing (ICIAP)*, Oral presentation, **Best Paper Award**, 2015.

**I. Kuzborskij** and F. Orabona. [Stability and Hypothesis Transfer Learning](#). In *International Conference on Machine Learning (ICML)*, 2013.

**I. Kuzborskij**, F. Orabona, and B. Caputo. [From N to N+1: Multiclass Transfer Incremental Learning](#). In *Computer Vision and Pattern Recognition (CVPR)*, 2013.

**I. Kuzborskij**, A. Gijsberts, and B. Caputo. [On the Challenge of Classifying 52 Hand Movements from Surface Electromyography](#). In *Engineering in Medicine and Biology Society (EMBC)*, 2012.

## ACTIVITIES

### Reviewer

International Conference on Machine Learning (ICML)

Conference on Neural Information Processing Systems (NIPS)

Journal of Machine Learning Research (JMLR)

Conference On Learning Theory (COLT)

International Conference on Artificial Intelligence and Statistics (AISTATS)

International Conference on Algorithmic Learning Theory (ALT)

Elsevier Journal on Computer Vision and Image Understanding (CVIU)

## HONORS

Best Paper Award at the International Conference on Image Analysis and Processing 2015.

Postgraduate Tuition Award, Student Awards Agency for Scotland 2010

## TECHNICAL SKILLS

Machine Learning: empirical risk minimization, neural networks, SVMs, regularization, kernel methods, locally-linear methods, feature selection.

Optimization: (Stochastic) gradient methods, accelerated methods, proximal methods, elements of submodular optimization.

Learning theory: algorithmic stability, concentration bounds, uniform deviation bounds, Rademacher complexity, tools from online and nonparametric analysis.

Programming: python (numpy, scipy, scikit-learn), C++, Tensorflow, grid computation (SGE / MapReduce).