

---

## PhD in Video Indexing at INRIA Grenoble

◦ **Environment :**

This thesis will take place in the LEAR team at INRIA Grenoble, see <http://lear.inrialpes.fr>. LEAR is an international team with English the working language. Grenoble lies in the French Alps with excellent skiing, hiking and climbing possibilities.

◦ **Description :**

This PhD addresses web-scale video indexing and recognition, a problem which currently receives increasing interest due to the huge number of personal and professional multimedia databases. The goal is to improve the representation of videos to obtain maximum retrieval accuracy at the same time as low indexing and search complexity. This requires the design of very compact but discriminative representations. Ideally, the representation should be sufficiently compact to fit in memory even for millions of video frames.

The system will be based on local descriptors, which are the state-of-the-art in indexing and object recognition. These descriptors are numerous and highly-dimensional. To overcome the inherent computational issue of processing such descriptors, approximate nearest neighbor search [1,2,3] or the so-called bag-of-features representation [4,5] can be used. As a starting point, these two concurrent approaches, which have both shown their interest in the context of large-scale image search, will be merged. Furthermore, the temporal aspect will be taken into account, in order to improve both the large-scale indexing and the fine comparison of videos.

◦ **Profile :** The candidate should be familiar with at least 2 of the following domains :

- computer vision, image indexing
- source coding (in particular quantization), channel coding
- pattern recognition and machine learning

The candidate must have excellent knowledge of C/C++ and should be fluent in English.

◦ **Application :** Please send a CV and names of three referees to [Herve.Jegou@inria.fr](mailto:Herve.Jegou@inria.fr) and [Corde-lia.Schmid@inria.fr](mailto:Corde-lia.Schmid@inria.fr).

◦ **References :**

- [1] "Similarity Search in High Dimensions via Hashing", A. Gionis, P. Indyk and R. Motwani International Conference on Very Large Databases 1999
- [2] "Near-Optimal Hashing Algorithms for Near Neighbor Problem in High Dimensions" A. Andoni and P. Indyk. FOCS'2006
- [3] "Query-Adaptative Locality Sensitive Hashing", H. Jegou, L. Amsaleg, C. Schmid and P. Gros ICASSP'2008
- [4] "Video Google : A Text Retrieval Approach to Object Matching in Videos" J. Sivic and A. Zisserman ICCV'2003
- [5] "A contextual dissimilarity measure for accurate and efficient image search" H. Jegou, H. Harzallah and C. Schmid CVPR'2007