

# Welcome to ASPCALab v 0.2

Last updated: February 26, 2009

## 1 Introduction

ASPCALab is a collection of MATLAB functions that not only implement the sparse principal components estimation procedures proposed in [1] and but also reproduce all the figures and tables of the paper. It is written in the spirit of reproducible research, see [2].

After ASPCALab is successfully installed, all the figures in the paper could be reproduced by calling `JL09FigureX` (X is to be replaced by the actual Figure number, i.e., `JL09Figure1` for producing Fig.1 and so forth) and Table 1 could be reproduced by calling `JL09Table1`. Boaz Nadler's routine suggested in his discussion on [1] is called `CORR.PCA.Algorithm`. The routine for plotting the figure in the rejoinder is `JL09RejoinderFig`.

## 2 Installation

We assume that the user has installed Wavelab850 on his/her computer. (Otherwise, please do so before installing ASPCALab.) If this is the case, please proceed as the following to install ASPCALab:

1. Download `ASPCALab.zip` and put it into some directory you would like to keep ASPCALab for future use (referred to as `userdir` in the following);
2. Fire up MATLAB and *change the current directory to userdir*;
3. In MATLAB command line, successively type
  - (a) `unzip ASPCALab.zip`;
  - (b) `cd ASPCALab`;
  - (c) `ASPCAPath`;
4. If you want, you could now remove the `.zip` file.

The command `ASPCAPath` will automatically install ASPCALab for you. During its execution, you need to determine whether you want to modify your `startup.m` file so that MATLAB automatically loads ASPCALab in future sessions. It is recommended that you do so.

## 3 Dependence

1. The main routines `ASPCA` and `ASPCAalp` depend on the Wavelab850 toolbox, which is available at: <http://www-stat.stanford.edu/~wavelab/>;
2. The routine `SmoothPCA` depends on the MATLAB standard splines toolbox.

## 4 Contributors

Contributors to the current version of ASPCALab include:

- Iain M. Johnstone (Stanford University),
- Arthur Y. Lu (Renaissance Technologies),
- Zongming Ma (Stanford University),
- Boaz Nadler (Weizmann Institute of Science).

## 5 Feedback and Comments

If you have any comment or encounter any problem while using ASPCALab, please write to Iain M. Johnstone: [imj@stanford.edu](mailto:imj@stanford.edu).

## 6 Copyright and Warranty

For copyright and warranty information, see `COPYRIGHT.m` and `WARRANTY.m` in the Documentation folder or type `help('COPYRIGHT')` and `help('WARRANTY')` after you have installed ASPCALab.

## References

- [1] Iain M. Johnstone and Arthur Y. Lu. On consistency and sparsity for principal components analysis in high dimensions (with discussion). *To appear in JASA*, 2009.
- [2] David L. Donoho, Arian Maleki, Inam Ur Rahman, Morteza Shahram, Victoria Stodden. Reproducible Research in Computational Harmonic Analysis. *Computing in Science and Engineering*, vol. 11, no. 1, pp. 8-18, 2009.