The goal of this mini-project is to provide tools for the efficient implementation of algorithms for solving scientific computing problems, arising from fields like machine learning, engineering, physics, statistics, image and signal processing and more. The students will learn the basic computational tools that are relevant for a specific computational problem and will implement an efficient existing algorithm for its solution. In some cases, it will be possible to conduct research for improving the existing algorithms. The work in this course requires mathematical knowledge and programming abilities, including parallel and/or distributed programming. The main languages that will be used are Matlab and Julia (a new Matlab-like language http://julialang.org/) and basic languages like C/C++/Fortran for small parts of the program. The final goal of the course is to have a small open-source program implementing the chosen algorithm.

**References**

Shai Shalev-Schwartz, Shai Ben-David. *Understanding machine learning: from theory to algorithms*, 2014.