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## Undergraduate Internship Program - Spring 2015

### Final Report

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This small report serves as a summary of the work and activities developed at Carnegie Mellon University (CMU), Pittsburgh, as part of the Undergraduate Internship Program sponsored by the Carnegie Mellon Portugal Program.

Hosted by Professor Xin Li, the internship started in February and lasted until the end of April. The main objective of my work was to develop and test an hardware implementation of a recovery algorithm for compressive sensing measurements, specifically images. As one of the most used algorithms in software implementations, Iterative Hard Thresholding was the recovery algorithm chosen and the hardware platform to be used, given its flexibility, a field-programmable gate array (FPGA). The development of this project went through several phases starting with a high level implementation of the algorithm using Matlab. After this phase, an architecture for the hardware processing core was devised and implemented using the hardware description language, Verilog.

Since this work was a small part of a bigger project being developed by Professor Xin Li's research group, I had the opportunity of taking part on weekly meetings with him, his students and Professor Donald Thomas. These meetings allowed us to discuss work developments as well as brainstorm about choices that had to be made or problems encountered during the week. This gave me the opportunity to experience a different, more dynamic work environment where while each person had a different task to complete, there was an effort to help each other. Furthermore, the presence and input from both professors also led to a better and faster development.

Besides working on the project, I also attended a few of the several seminars taking place every week at CMU. It was very interesting to see that there was such an offering of seminars and presentations throughout the weeks, with the attendance to almost all of them being open to everyone. There was always some activity going on at the University, from a job fair to a carnival, which gave a sense of investment on the campus life that transcends the classrooms.

In addition to the campus life, I was able to visit the city of Pittsburgh, which has a lot to offer, be it in sports with its baseball, ice hockey and football teams, art and natural museums or simply the views and the city itself.

This opportunity allowed me not only to be a part of a different work and research environment but also to visit new places and experience different cultures. For this and all of the rest, I am very grateful to the Portuguese Foundation for Science and Technology (FCT), the Carnegie Mellon Portugal Program and the Carnegie Mellon University for making this program possible. I would also like to extend my thanks to Professor Xin Li for his guidance at CMU, Professor Vítor Tavares for his guidance from Portugal and all of the Carnegie Mellon Portugal staff for the help during all of the preparation and the duration of the program.