

Munich Aerospace Open PhD Position

Fast Solvers: Algorithms, Software and Hardware Solutions for Fast and Advanced Sparse Reconstruction

Description:

By utilizing the sparsity property signals can be well reconstructed from much fewer samples than the conventional Shannon sampling theory requires. In the last 5 years, along with the significant development of the compressive sensing theory, exploitation of sparsity brought breakthroughs in many fields such as medical imaging, computational biology, astronomy, communications, and computer graphics. However, the concept of sparsity in remote sensing for earth observation has not been well studied so far. The envisioned PhD work is part of the Munich Aerospace project "SparseEO: Sparse Reconstruction and Compressive Sensing for Remote Sensing and Earth Observation" whose goal is to exploit sparsity in the field of remote sensing data acquisition and operational processing for earth observation.

The goal of this PhD work is to develop algorithms, software, and hardware implementations which can provide fast solvers for sparse reconstruction problems tailored to applications in remote sensing. The solver algorithms will consider both the remote sensing specific requirements (mathematical model, data rate, data volume) and their hardware implementation. The solvers will be implemented using advanced parallel techniques, i.e. by combining GPU and CPU in order to jointly utilize numerous threads of GPU and the larger memory of CPU. The appropriate implementation for remote sensing problems of this strategy will be one of the main goals of this project.

This PhD work will be supervised by leading experts on sparse reconstruction from the Chair in Applied Numerical Analysis, TUM (TUM-LANA). Experts from Chair of Numerical Mathematics, TUM (TUM-LNM) and Department of Computer Science 10, University of Erlangen will support this PhD work. This work will be carried out in close cooperation with remote sensing experts in Remote Sensing Technology Institute, DLR (DLR-IMF) and Remote Sensing Technology Department, TUM (TUM-LMF)

Profile:

- Master in Mathematics, Physics, Computer Science or equivalent
- Knowledge in GPU and CPU Parallel programming
- Creative and cooperative

The Munich Aerospace scholarship is typically awarded for a four-year period. The monthly scholarship is 1575€ based on the Munich Aerospace regulations, including the opportunity to participate training and courses in the Munich Aerospace graduate school. Additional funding for conferences and publications is granted.

Interested candidates should submit a full curriculum vitae, covering letter together with academic records to the email addresses given below.

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