

# Ádám Szűcs

## EIT Digital Budapest DTC

PhD topic: Informatical system and mathematical problem-performance optimization on modern GPU architectures

PhD supervisor: Dr. Attila Kovács, ELTE, Dr. Péter Horváth, FIMM

Industrial partner: Balázs Erdélyi (Fermentia Ltd.)

Contact: [szucs@fejer-hvk.hu](mailto:szucs@fejer-hvk.hu)



'EIT Digital gave me the best opportunity to get the mindset of an entrepreneur, while on top of my PhD studies it provided the potential to communicate and network by inviting leaders from successful companies and firms.'

### Achievements & further plans

For the time being, besides his EIT Digital studies Ádám is working at a Research laboratory (BIOMAG) in the National Brain Research Programme, and he holds courses at ELTE University on Discrete Mathematics and Parallel Programming for MSc students specializing in Numerical and algebraic studies. His research interests are **optimization of mathematical models**, parallelizing on **GPUs and Image processing**. His results are published mostly in international journals and at conferences. Currently, he is spending his Geographical Mobility in Zürich Switzerland, Bitplane AG, under the supervision of Igor Beati and Peter Majer.



The potential in being able to produce more sophisticated and better quality of bacteria can impact life from the microbe level to the more complex structures like the human body.

### Educational status at Spring semester of 2016:



RA



OR



BMD



GH



Mobility



BDExp.

### Reserach topic

Initially he worked on parallelizing on Diophantine approximation problems, where they reached a 4 times speedup compared to Intel Xeon processors on a single graphical chip. Currently, he is focusing on optimizing segmentation and reconstruction methods in 3D for biological computations.

The method that he is developing is an automatic segmentation method which helps the biologists to speed up their research process of quality control and checking. The expected result is a framework with real time reconstruction and segmentation in the hands of researchers in the agricultural and medical fields. The basics of the developed algorithms are Level-set methods (Hamilton-Jacobi equations), Voxel-based reconstruction and, in general, numerical mathematics.

There is an emerging power in biological research on sustainable agriculture because of the bad side-effects caused by the chemical fertilizers. In this field it is crucial for the bio fertilizer manufacturers to get a fast quality control process which helps them maximize their efficiency. With EIT, Adam built a connection with Fermentia LLC to drive his research into innovation and sharpen his methods according to the needs of the industry.