Transnational Access Report

1. General Information

Project Acronym (ID):	Bend it like Beckham1
Project Title	Characterization of the gravitropic bending response of *Arabidopsis thaliana* roots
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2. Duration of access

Begin of the project First day the installation was used	End of the project Last day the installation was used
1st of February 2013 11th of March 2013	21st of March 2013 19th of March 2013

3. Project summary (max. 250 words)

My PhD research focuses on the identification and characterization of genes involved in root gravitropism in *Arabidopsis thaliana*. Root gravitropism is hypothesized to result from higher auxin concentrations accumulating at the lower side of the root. We recently validated this prediction using a novel auxin sensor (DII-VENUS) in combination with a mathematical model that quantifies auxin concentration, revealing that auxin asymmetry between the lower and upper side of a gravistimulated root develops 1-2 minutes after the gravity stimulus.
It was shown before that the Auxin Response Factor pair ARF7/ARF19 plays a critical role in auxin-dependent root gravitropism. To understand how growth can be reoriented upon gravistimulation, a microarray analysis was performed to profile the global expression profile in the meristem and elongation zone of wild-type and the agravitropic *arf7arf19* double mutant upon gravistimulation. This was done to compare their two transcriptomes across seven time points after a gravity stimulus. 800 genes were found to be differentially expressed in *arf7arf19* relative to the wild-type. To perform a reverse genetics approach their respective T-DNA insertion lines were ordered, genotyped and their root bending response was studied. These phenotypic screens identified 30 T-DNA insertion lines that showed agravitropic phenotypes between the 1st and 10th hour after a gravity stimulus. The aim of my project is to find out how roots bend upon a gravitropic stimulus, which genes play an important role in this and how these achieve this.

4. Main achievements (max. 250 words)

The putative aspartyl protease was expressed mainly in the epidermal cells, which suggests its potential role in the reassembly of the cell wall upon gravistimulation. In the case of the calcium-dependent protein kinase, the protein was localized in the cytoplasm of epidermal and cortical cells along the meristematic and elongation zones. No visible changes in the distribution of the mentioned two proteins were observed when the square Petri dishes were turned 90° and imaged for the first 5 min after the gravity stimulus.
The use of the vertical confocal allowed me to confidently visualize the protein-GFP fusions, without having the possibility that an unwanted gravitropic stimulus would influence the result (which would be the case when a normal horizontal microscope would have been used).