

BASIC INFORMATION ON SUB-PROJECT

NAME OF PROGRAMME/FUND	Scholarship Fund - Sciex NMS ^{ch}
RESEARCH FIELD AND OTHER RESEARCH FIELDS INVOLVED (if applicable)	Mathematics / Natural Sciences
TITLE OF THE SUB-PROJECT	Mechanical modelling of plant growth (MMPG)
REGION OF THE CZECH REPUBLIC (according to the location of the home institution)	Pilsner Region
GRANT AMOUNT SPENT	47 731,40 CHF
INTERMEDIATE BODY	Swissuniversities
HOME INSTITUTION	University of West Bohemia in Pilsen Department of Mechanics
HOST INSTITUTION	Université de Fribourg Department of Mathematics
NAME OF THE FELLOW	Robert Cimrman

<p>ABSTRACT OF THE SUB-PROJECT</p>	<p>Understanding the origin of the unique regular arrangements of plant lateral organs (e.g. leaves) around a central axis is one of the intriguing tasks of the contemporary plant research. Recent molecular genetic experiments suggest that the key process regulating phyllotaxis is the active transport of the plant hormone auxin which interacts with the tissue mechanics. Due to the complex nature of the problem and to difficulties with "in vivo" measurements, all biological hypotheses have to be analyzed using computer models. The Swiss host team takes part in the SystemsX project "Plant Growth", which aims at creating such a plausible computer model of hormone signalling coupled with mechanics on a cellular level. The presented project inscribes into this framework and proposes a Swiss-Czech collaboration on the development of a mechanically sound model of plant cell tissue. The aim of this project is to create, based on the observed cell physiology, a mechanical model of plant growth relevant to a macroscopic piece of tissue of hundreds of individual cells (e.g. the meristem). The proposed mechanical model will be then coupled with the already developed auxin hormonal signaling models and osmotic models in order to help elucidate the complex phyllotactic patterns appearing in nature from the mechanical point of view.</p>
<p>MAIN RESULTS</p>	<p>Mechanical model of plant tissue including osmosis and its software implementation.</p>
<p>DATE OF REALISATION OF THE FELLOWSHIP</p>	<p>1.9.2010 – 31.10.2010, 1.1.2011-30.4.2011</p>
<p>MORE INFORMATION ON THE PROGRAMME</p>	<p>www.sciex.ch</p>