

BASIC INFORMATION ON SUB-PROJECT

NAME OF PROGRAMME/FUND	Scholarship Fund - Sciex NMS ^{ch}
RESEARCH FIELD AND OTHER RESEARCH FIELDS INVOLVED (if applicable)	Physics, Engineering Sciences
TITLE OF THE SUB-PROJECT	Novel iterative phase-retrieval approach for sensing the phase in in-vivo microtomography (NIPASIM)
REGION OF THE CZECH REPUBLIC (according to the location of the home institution)	Prague
GRANT AMOUNT SPENT	60 216,15 CHF
INTERMEDIATE BODY	Swissuniversities
HOME INSTITUTION	Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering
HOST INSTITUTION	Paul Scherrer Institut, Synchrotron Radiation and Nanotechnology
NAME OF THE FELLOW	Martin Nývlt

<p>ABSTRACT OF THE SUB-PROJECT</p>	<p>In vivo 3D imaging of soft tissue at the micrometer lengthscale has not yet been demonstrated. The Tomography beamline of the Swiss Light Source is a world-leading facility that is in the best position to demonstrate for the first time micrometer scale in-vivo 4D tomography. Our proposal aims to contribute to the development of real-time Synchrotron-based X-ray tomographic microscopy in phase contrast mode by bridging the X-ray and visible optics communities. Currently there is no available quantitative phase-retrieval technique for X-ray imaging that would offer high spatial resolution, be robust to noise and compatible with in-vivo measurements. Clever implementation of iterative phase retrieval methods exploiting the knowledge gained in optical image processing coupled to profound understanding of photons-matter interaction in the X-ray domain will complement the current hardware development at the beamline. Two biologically relevant scientific cases will be immediately addressed with the newly developed phase-space-time imaging methods: breathing and flying. The fellow will join two groups of current collaborators to elaborate on these two biology projects. The expected results will have a very high impact for the whole field of biomedical imaging.</p>
<p>DATE OF REALISATION OF THE FELLOWSHIP</p>	<p>7.5.2012 - 6.5.2013</p>
<p>MORE INFORMATION ON THE PROGRAMME</p>	<p>www.sciex.ch</p>