

## Time-resolving the dynamics of plant autophagy molecular machinery

PhD position in Biology. Plant Cell and Molecular Biology

Department of Molecular Sciences, SLU, Sweden

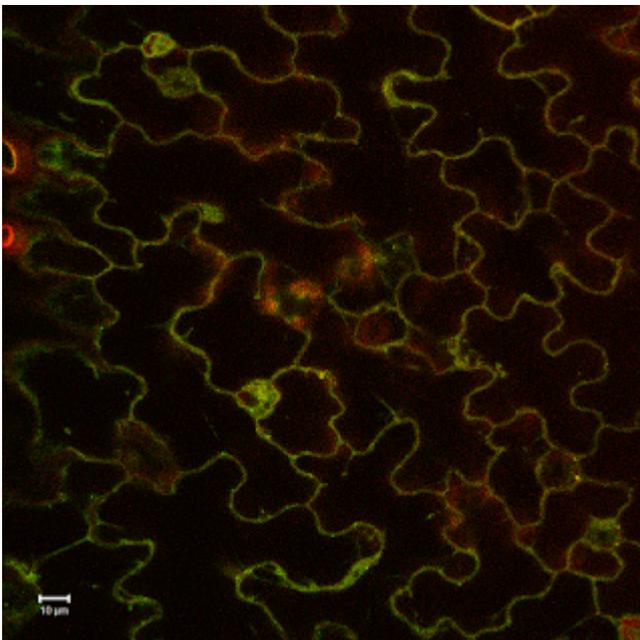


### Work environment

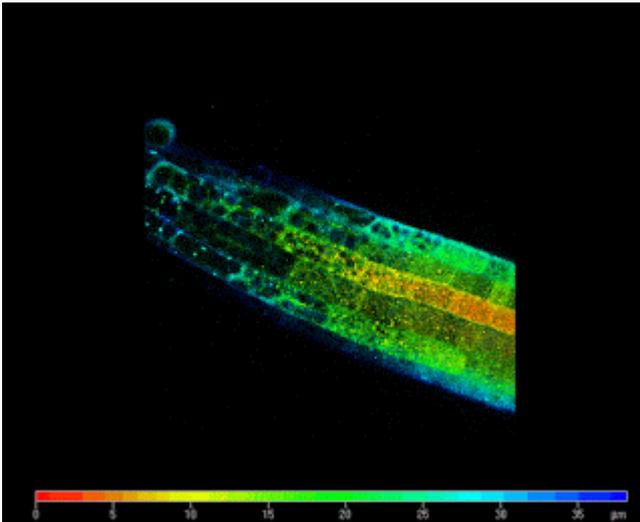
Swedish Agricultural University (SLU) is one of the [highly-ranked universities](#) world-wide. The department of [Molecular Sciences](#) belongs to [the NJ-faculty](#) and is located at the [Uppsala BioCenter](#), Ultuna campus of [SLU](#). Our department is a vivid, multicultural workplace employing over a hundred researches with a very broad range of expertise including nanotechnology, inorganic and organic chemistry, structural biology, food science, microbiology, plant biochemistry and cell molecular biology. The department hosts or is responsible for outstanding facilities for protein crystallography, chromatography, bioreactor, [NMR, mass spectrometry](#), advanced microscopy: [AFM](#), SEM, [confocal microscopy](#) and contributes to the development and use of the [Max IV synchrotron](#). The department provides a nourishing environment for establishing new transitional research. The doctoral student will be working in a young research group interested in plant autophagy.

### The project

We are looking for a highly motivated doctoral student to join us in investigating intricate regulation mechanisms of plant autophagy.



Green, GFP-tagged autophagosomal marker in epidermal cells of *Arabidopsis* cotyledon under normal conditions. Red, autofluorescence of chlorophyll. Alyona Minina, unpublished.



3D reconstruction of autophagy marker detected in *Arabidopsis* root (the signal is color coded for depth).  
Alyona Minina, unpublished.

**Autophagy** is the major catabolic process of eukaryotic cells, its molecular machinery is highly conserved and is controlled by the so called **autophagy-related (ATG)** genes. Autophagy is implicated in developmental processes and stress responses in all eukaryotes including plants. Plant autophagy is important for drought and salt stress tolerance, plant-pathogen interactions, fecundity and longevity of the plant (1, 2). In our previous studies we demonstrated that artificial up-regulation of autophagy has an invigorating effect on plant performance (3, 4). Despite the obvious importance of plant autophagy, little is known about the dynamics of this process. In this project the doctoral student will perform a **detailed time-resolved *in planta* analysis of autophagic response to a short and prolonged stress, focusing on duration of the transcriptional and post-translational signaling.** The PhD student will use forward and reverse genetics tools, build on the systems for *in vivo* autophagy detection developed in our group, analyse changes in the transcriptome dynamics, use advanced fluorescent microscopy and molecular biology tools to thoroughly characterize the chain of events activating and modulating plant autophagy response to various stress conditions. The knowledge obtained in this project will be an extremely important contribution to our understanding of plant autophagy.

Furthermore, the doctoral student will have a unique opportunity to collaborate with the [SweTree Technologies AB](#) to test applicability of our proof of concept results on the crop tree species.

### Education

The department is an organizing participant of two graduate schools, providing access to a broad range of advanced courses on genetics, bioinformatics, cell and molecular biology, biochemistry, advanced microscopy, structural biology, statistics, teaching in higher education, career development, writing scientific publications etc.

As a part of the project, the doctorate student will receive an advanced personal training in the methods relevant for the project by the experts in our group and by our collaborators.

## Qualifications

The successful candidate **must have basic eligibility for third cycle education**, i.e. she/he has taken a second cycle qualification or has completed course requirements of at least 240 higher education credits, including at least 60 higher education credits at the second cycle education and holds a Master's degree in biology or similar.

The candidate must be highly motivated, interested in working in a multicultural environment, be fluent in spoken and written English (upper secondary school grades equivalent to English B/English 6). Experience with molecular biology, basic knowledge of statistics and bioinformatics are required, experience with *Arabidopsis thaliana* model organism is a benefit.

## Employment

Four years of full-time employment as a doctoral student at SLU. Additionally, the employment will be prolonged to compensate for the doctoral students' time spent on teaching at the department (up to 20% of the planned 4 years).

## Supervision

Main supervisor: [Alyona Minina](#) (E.A. Minina)

Co-supervisor: [Peter Bozhkov](#)

## Starting date

December 10th, 2018 or later (the date is negotiable)

## SLU is an Equal Opportunity Employer

Read about the PhD education at the NJ faculty of SLU [here](#)

Selection among applicants meeting the requirements is made with reference to written application including curriculum vitae, copies of degrees and transcripts of academic records, one copy of the dissertation for masters or undergraduate degree, a list of at least two references familiar with the applicant's qualifications, certified knowledge of the English language and an interview.

## How to apply

Please fill in this [APPLICATION FORM](#) (use the ref number advertisement **SLU ua 2018.2.5.1-2242**)

The filled form together with the specified enclosures must be sent to [registrator@slu.se](mailto:registrator@slu.se) **no later than 2018.09.30**. Incomplete applications or applications submitted after the deadline will not be considered.

## Academic union representatives

Contact info [here](#).