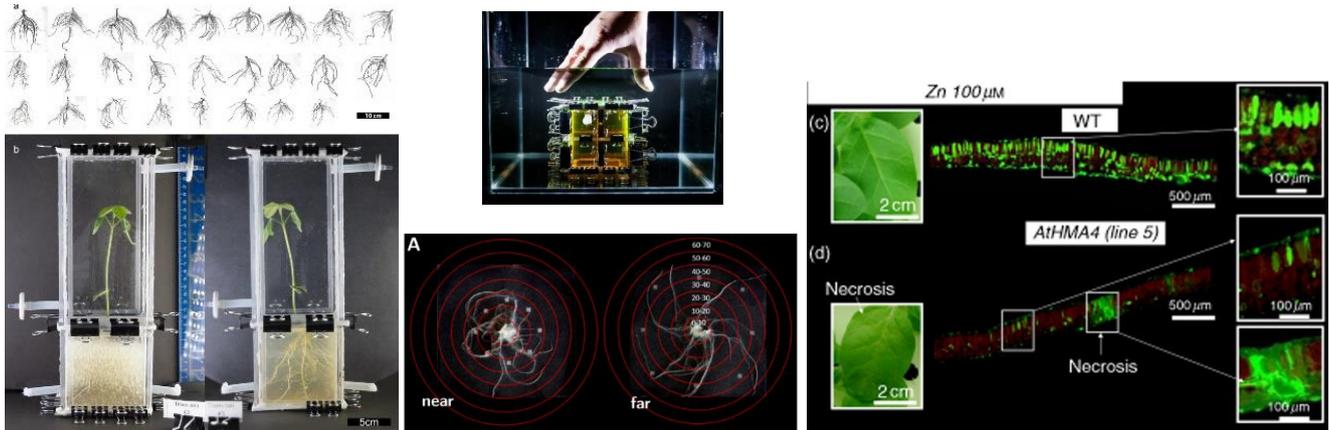


PhD student opportunity on studies of plant chemotropism



Application deadline: 20 May 2022, 23:59 CET

Project description:

Plants are sessile life forms that rely on a multitude of environmental stimuli (e.g., light, gravity, water, nutrients) to direct their growth for survival. Phenomena of plant “movements” towards cue is called tropism and toward nutrients chemotropism. Knowing the mechanisms of chemotropism will allow us to select or modify plant for use in the environments where nutrients are scarce, to reduce fertilizer use or/and to increase plant nutritional value (biofortification).

We are seeking talented, hard-working and motivated applicant who is keen to pursue a 4 year structured PhD program in plant biology studying mechanisms of plant roots movements toward Zn/Fe (chemotropism). The main questions of the projects are:

- (i) What is driving Zn, and what is driving Fe chemotropic root growth?
- (ii) What are the molecular mechanisms that drive Zn/Fe chemotropic response?
- (iii) What enables control over root growth direction in Zn/Fe chemotropism?

To uncover how a plant decides about the direction of growth in soil and investigate the mechanisms of Zn or Fe chemotropism successful candidate will use:

- 1) phenotyping approaches that employ Transparent Soil (round gel beads with water and nutrients) and 2D paper microfluidic platform to study real-time roots growth of *Nicotiana tabacum*.
- 2) Immunolocalization, confocal and electron microscopy with elemental analysis to show chemical composition or/and structural changes of cell wall due to chemotropism
- 3) Gene expression analysis (mRNA-seq) to discover molecular mechanisms that drive Zn/Fe chemotropism

The passion for experimenting and tinkering, creativity and basics of plant biology and molecular biology are paramount for project success.

Successful candidate will have/fulfill:

- MSc degree earned in biology, biotechnology or molecular biology or similar field (incl. engineering) not later than start of the PhD
- qualification requirements for Doctoral School of Exact and Natural Sciences at University of Warsaw (at beginning of employment)
- imagination and creativity skills,
- motivation and enthusiasm to work in laboratory conditions
- ability to develop new and existing methods and their adjustment for experimental needs,
- excellent work ethics,
- basic knowledge of plant biology (anatomy, physiology, cell biology)
- advanced English, including scientific writing and reading (biology field), fluent communication – presentation skills are welcomed

Additionally, experience (preferred) with:

- lab work (with plants is additional asset),
- molecular biology and basics of bioinformatic analysis both in dealing with mRNA-seq analysis
- software:
 - Bioinformatics (like R),
 - Image analysis (like ImageJ)
 - Statistics (like SPSS)
- microcomputers (Raspberry Pi/Arduino)

Duties:

The PhD student will be performing experiments, analyzing data and presenting results on domestic and international meetings. Particularly, the student will perform/develop skills in:

- Phenotyping platform modifications and experimental setup (*more info: (i) Ma, L., Shi, Y., Siemianowski, O., 2019. Hydrogel-based transparent soils for root phenotyping in vivo. PNAS, 116(22), pp.11063-11068 and (ii) Lind, K.R., Siemianowski, O., 2021. Evidence for root adaptation to a spatially discontinuous water availability in the absence of external water potential gradients. PNAS, 118(1)*)
- sample preparation for mRNA-seq analysis (RNA isolation, DNase treatment and quality check on bioanalyser),
- mRNA-seq data analysis
- development of knock-out mutants and test their phenotypes.
- immunolabeling and confocal imaging
- SEM and/or TEM with EDS analysis

The workload will be progressively adjusted with Student's skills development and PI will be participating and working along in all tasks.

Application must be sent by email in one PDF file and consist of:

- Curriculum Vitae*, that includes list of publication, conference participation, scientific related activities
- Short (max. 250 words) letter outlining your research interest and motivation, describing how it could contribute to the project
- contact details (email + phone) for at least 1 reference (one of which is MSc Principal Investigator)
- Please include at the end of your offer: "I hereby give consent for my personal data included in my application to be processed for the purposes of the recruitment process under the Personal Data Protection Act as of 10 May 2018 (consolidated text: Journal of Laws 2019, item 1781) and pursuant to art. 6 § 1a GDPR (General Data Protection Regulation - EU 2016/279). I acknowledge that University of Warsaw (Krakowskie Przedmieście 26/28, 00-927 Warsaw) is the administrator of my personal data."

Application should be sent email: o.siemianowski@uw.edu.pl (email may be use for informal inquiries)

Employment conditions:

Employment based on NCN and Doctoral School Stipend

Timeline: 36 months on NCN Stipend + 12 months within University of Warsaw Doctoral School of Exact and Natural Sciences

Employment date could be negotiated but preferred not later than 1 August 2022.

Max. Monthly stipend: 5000 zł (PLN) gross/ ~3750 zł (PLN) net, and may depend on candidate experience, additional funding may be possible.

Additional information: Work will be done within Department of Plant Metal Homeostasis at University of Warsaw, campus Ochota. PhD students are entitled to apply for affordable student housing at the University. Warsaw is the capital of Poland (EU country) and is well communicated with rest of the EU. University may help with visa application.

Project title: Study of mechanisms modifying tobacco root growth direction in response to heterogeneous distributions of Zn and Fe in the environment

PI: Dr Oskar Siemianowski