

The Faculty of Science / the Institute for Biology is looking for :

## **2 PhD candidates in Plant Molecular Biology**

**Vacancy number: 22-740**

### **Project description:**

#### **Environmental and genetic drivers of wood and lignin formation in flowering plants (WOODLIG)**

Lignin is a plant biopolymer that is abundantly present in the cell walls of so-called lignified cells. Cell wall lignification occurs during cell differentiation and provides mechanical support to the plant body, facilitates long-distance water transport, or prevents water loss. Lignin molecules are most abundantly present inside wood tissue that is produced by a layer of undifferentiated cells in the plant root or stem. The life cycle of woody species is generally much longer than that of herbaceous species, with slower growth and a more extended juvenile period before flowering. Thus, wood formation is linked to other developmental features, such as flowering time, but the genetic basis for the coupling of woodiness to other developmental aspects is yet unknown. Lignin (and wood) can also be induced by stress conditions, such as drought. However, the regulatory mechanisms underlying drought-induced lignification are mainly unknown.

Increased lignin deposition in plant cell walls as well as increased wood formation in stems and roots have been suggested as a key strategy for drought tolerance. Drought tolerance is currently a key trait in crop breeding, as traditionally productive agricultural areas suffer heavily from recurring and more intensive drought cycles across the globe. At the same time, as lignified wood tissue is a major constituent of agricultural residues, we should take advantage of its value in the biobased economy in terms of residue valorisation. Indeed, lignin has high potential in applications such as glues and asphalt, meaning that increased lignin content provides opportunities for replacement of fossil-derived products by left-over plant parts of more drought resilient crops.

In this *WOODLIG* project, the 2 PhD students at Leiden University will work as part of a consortium together with a technician and four other PhD students at respectively Naturalis (Leiden), Wageningen University and Groningen University. At Leiden University we aim to answer the following two key questions:

1. What are the genes and their interactions that control lignification and wood formation in stems of flowering plants, and can we disentangle the woodiness phenotype from coupled longevity phenotypes? (**PhD1, Offringa lab**)
2. What are the transcription factors and gene regulatory networks involved in drought-induced lignification/woodiness? (**PhD2, Balazadeh lab**)

**Key responsibilities:**

- Plan and conduct research activities (incl. establishing new molecular techniques)
- Write progress report (every six months)
- Write manuscripts for publication of significant research results
- Present research at workshops and international conferences
- Co-supervise undergraduate and graduate student projects
- Participate in undergraduate teaching

**We seek candidates with the following criteria:****Both PhDs**

- Master's degree in Biotechnology, Molecular Biology, or related areas
- Fluency in English (reading, writing and speaking) is required
- Good organizational skills
- Being capable of presenting data at meetings and conferences.
- Experience in or affinity with bioinformatics and plant research

**For the assessment of PhD-1 (Remko Offringa labs)**

- Profound theoretical knowledge and experience in molecular biology and plant developmental genetics is preferred

**For the assessment of PhD-2 (Salma Balazadeh lab)**

- Profound theoretical knowledge and experience in molecular biology and plant abiotic stress biology is preferred

**Research at our faculty**

The Faculty of Science is a world-class faculty where staff and students work together in a dynamic international environment. It is a faculty where personal and academic developments are top priorities. Our people are committed to expand fundamental knowledge by curiosity and to look beyond the borders of their own discipline; their aim is to benefit science, and to make a contribution to addressing the major societal challenges of the future.

The research carried out at the Faculty of Science is very diverse, ranging from mathematics, information science, astronomy, physics, chemistry and biopharmaceutical sciences to biology and environmental sciences. The research activities are organised in eight institutes. These institutes offer eight bachelor's and twelve master's programmes. The faculty has grown strongly in recent years and now has more than 2800 staff and almost 6000 students. We are located at the heart of Leiden's

Bio Science Park, one of Europe's biggest science parks, where university and business life come together.

For more information, see [www.universiteitleiden.nl/en/science](http://www.universiteitleiden.nl/en/science) and <https://workingat.leiden.edu/>

## The Institute for Biology

The research within the Institute of Biology Leiden (IBL) aims to work on the science base of biodiversity and health, which is reflected in our leading principle *Harnessing Biodiversity for Health*. We perform innovative curiosity-driven research to answer fundamental questions, and solutions-driven research to help solving major societal challenges. The latter include protecting nature's biodiversity, creating sustainable biotechnology and agriculture and increasing good health. Our research focuses on four Research Themes: Bioactive Molecules, Host-Microbe Interactions, Development & Disease and Evolution & Biodiversity. Located in a thriving scientific environment with our Faculty of Sciences, Naturalis Biodiversity Centre, the Leiden University Medical Centre and the Leiden Bioscience Park, IBL offers an exciting, internationally oriented and inclusive place to work and study.

## Terms and conditions

We offer a full-time position initially for one year. After a positive evaluation of the progress of the thesis, personal capabilities and compatibility the appointment will be extended by a further three years. Salary ranges from € 2541 to € 3247 gross per month (pay scale P in accordance with the Collective Labour Agreement for Dutch Universities).

Leiden University offers an attractive benefits package with additional holiday (8%) and end-of-year bonuses (8.3 %), training and career development and sabbatical leave. Our individual choices model gives you some freedom to assemble your own set of terms and conditions. Candidates from outside the Netherlands may be eligible for a substantial tax break.

All our PhD students are embedded in the Leiden University Graduate School of Science [www.graduateschools.leidenuniv.nl](http://www.graduateschools.leidenuniv.nl). Through this graduate school and also through the IBL we offer several PhD training courses at three levels: professional courses, skills training and personal effectiveness. In addition, all plant PhD students at IBL are part of the national graduate school Experimental Plant Sciences (EPS), which offers advanced courses to deepen scientific knowledge in experimental plant research.

Leiden University is strongly committed to diversity within its community and especially welcomes applications from members of underrepresented groups.

## Information

Enquiries can be made to Remko Offringa for PhD1 ([r.offringa@biology.leidenuniv.nl](mailto:r.offringa@biology.leidenuniv.nl)) and Salma Balazadeh for PhD2 ([s.balazadeh@biology.leidenuniv.nl](mailto:s.balazadeh@biology.leidenuniv.nl)). If you have any questions about the procedure, please contact Sylvia Maas ([jobs@biology.leidenuniv.nl](mailto:jobs@biology.leidenuniv.nl)).

## Applications

To apply, please send an email to [jobs@biology.leidenuniv.nl](mailto:jobs@biology.leidenuniv.nl) indicating whether you apply for one or for both vacancies. Please ensure that you upload the following additional documents (combined in a single PDF file) quoting the vacancy number:

- Cover letter with motivation
- Curriculum vitae
- Names of two professional references
- Copy of higher education diploma

Only applications received **before 8 December 2022** can be considered.