Technische Universität München

Technische Universität München • Wissenschaftszentrum Weihenstephan • Lehrstuhl für Systembiologie der Pflanzen
Emil-Ramann-Str. 4 • 85354 Freising

Wissenschaftszentrum
Weihenstephan
Lehrstuhl für Systembiologie
der Pflanzen
Sprecher des SFB924

Prof. Dr.
Claus Schwechheimer
Emil-Ramann-Str. 4
85354 Freising
Germany

Phone: 08161.71.2880
Fax: 08161.71.2886
Mobil: 0151.19602560
www.wzw.tum.de/sysbiol/
www.wzw.tum.de/sfb924/

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Position anouncements (2 Ph.D. graduate student positions - funded)

The Department of Plant Systems Biology at the Technische Universität München (TUM) invites applications by highly motivated candidates for two Ph.D. positions in the field of plant systems biology and biochemistry/cell biology. Both positions are to be filled within the forthcoming months.

Characterizing of the *Arabidopsis thaliana* protein-protein interaction network

The proteins encoded in every genome mediate their biochemical roles by interacting with other proteins. Together the interacting proteins form complex interaction networks in which all proteins are connected to each other. Cellular systems are thereby organized in complex protein interaction networks that have emergent properties. Biological systems are 'more than the sum of their parts' and the network organization plays a critical role for this. To understand living systems it is important to study and understand how proteins are organized in these networks and how genetic variation alters networks to affect traits like yield or stress-resistance.

The goal of this highly collaborative project is to map the protein-protein interaction network using advanced protein interaction analysis technologies, including the yeast-two-hybrid system, and liquid handling robots. The resulting maps are analyzed using biochemical, statistical and computational tools. Other opportunities for study of plant-pathogen network interactions exist. Experience in computational data analysis and affinity to high-throughput experimentation is desirable.

References:

Arabidopsis Interactome Mapping Consortium; Braun P* (Chair) et al., Network Evolution in a Plant Interactome Map. Science 2011 Jul 29; 333:596-601

Independently Evolved Virulence Effectors Converge onto Hubs in a Plant Immune System Network. Mukhtar et al.; Science 2011 Jul 29; 333:601-7

Cell biological and biochemical characterization of auxin transport-regulatory protein kinases

The plant hormone auxin has the unique property that it is being transported from cell-to-cell in a directional and regulated manner through a system of auxin influx and auxin efflux carrier proteins. Auxin controls virtually all aspects of plant development, growth and tropic responses. The auxin efflux carriers of the PIN family are polarly localized in a cell and their polarity seemingly allows to predict auxin transport through the plant. PIN polarity is regulated by phos phorylation via the protein kinase PINOID. We have recently identified a related protein kinase, D6PK, which we believe to regulate auxin transport activity.

Goal of the proposed Ph.D. thesis project is to understand the regulation of PIN by D6PK. To this end, the lab has generated a large set of genetic, cell biological and biochemical tools and technologies that will allow the successful applicant to unravel the molecular mechanisms underlying auxin transport activity regulation using cell biological and biochemical methods.

Reference

Melina Zourelidou, Isabel Müller, Björn C. Willige, Carola Nill, Yusuke Jikumaru, Hanbing Li, and Claus Schwechheimer (2009). The polarly localized D6 PROTEIN KINASE is required for efficient auxin transport in *Arabidopsis thaliana*. Development 136(4): 627 - 636.

Location

The Department of Plant Systems Biology of the Technische Universität München is located on the Weihenstephan campus in Freising, ca. 30 km north of Munich. The department has direct access to state-of-the-art facilities for research in molecular biology, biochemistry, proteomics and microscopy.

Funding is according to TVL13 (50 – 80%).

Please send your application in English or German (cover letter, CV, transcripts and contacts of two references) to pascal_braun@ymail.com (topic 1) or claus.schwechheimer@wzw.tum.de (topic 2).

Further information about the laboratory can be found at: www.wzw.tum.de/sysbiol/