A position for a post-doctoral researcher

in genetics and genomics

is available as part of a Human Frontier Science Program-funded project to study mirror-image flowers (Barrett, 2002; Jesson & Barrett, 2003). The overall project seeks to link the molecular and cell-biological basis of left-right asymmetry in the sex-organs of flowers with the ecological consequences of this floral adaptation and to retrace its evolutionary history. A summary of the overall project is included below and can also be found here. The duration of the position is for **three years**, with a **start date** in **early 2022**.

The post-doctoral researcher will be based in the group of **Michael Lenhard** (University of Potsdam, Germany) and will work on the genetic and genomic basis of mirror-image flowers in *Wachendorfia* and *Cyanella*, and the evolution of the genetically determined condition from the random left-right asymmetry in their flowers. She/he will cooperate closely with others as part of a team of four post-doctoral researchers that study mirror-image flowers from a number of different perspectives.

The ideal candidates should hold a **PhD in the field of genetics or genomics** and have both **bioinformatics expertise and molecular-biology skills**. She/he should have commensurate research experience as demonstrated by international publications. A passion for plant science, strong motivation, excellent organizational and communication skills are essential.

Please send **applications as a single PDF** including a CV, a motivation letter, and names and addresses of two references to Michael Lenhard (michael.lenhard@uni-potsdam.de).

Applications will be considered until the position is filled.

Project summary

Left-right (LR) asymmetry is a fascinating feature of many plants and animals. Striking examples include the asymmetric placement of internal organs in vertebrate or the left- vs. right-ward coiling of snail shells. Such LR asymmetries raise a number of fundamental questions: (1) How is symmetry broken in a consistent manner to tell left from right? (2) How is this translated into an asymmetric morphology? (3) What is the functional importance of LR asymmetries? (4) How did they evolve? While some of these questions are beginning to be answered in a few animal models, an integrative understanding that would link the molecular and structural determinants of symmetry breaking to their functional impact and their evolution is still missing for any example. Here, we will aim for such an integrative understanding by using the mirror-image flowers of enantiostylous plants as an eminently tractable model. Studying such an LR asymmetry in plants for the first time may also uncover novel molecular mechanisms of symmetry breaking.

In mirror-image flowers the female style is either deflected to the left or to the right of the midline, while one of the male anthers points to the other side. This reciprocal arrangement is thought to result in segregated pollen deposition on pollinators' bodies and thus to promote outcrossing. In three families, a form of mirror-image flowers has evolved where all flowers on an individual are of the same type and the direction of style deflection is under simple genetic control; a dominant vs. recessive allele at a single genetic locus determine right vs. left deflection of the style and of the anther in the opposite direction. In all three families, this has evolved from a state where left- and right-styled flowers occur together on the same plant, providing a clear example for the genetic fixation of an initially variable phenotype. As such, mirror image flowers are an outstanding model for investigating LR asymmetry, as they combine a simple genetic control of directionality with a clear hypothesis for their functional relevance and a plausible scenario for their evolution.

Therefore, to obtain an integrative understanding of LR asymmetry we will (1) elucidate the genetic and chromosomal basis of mirror-image flowers; (2) determine the molecular and structural basis of their symmetry breaking; (3) characterize their cell-biology and development; (4) analyze the functional significance of mirror-image flowers; and (5) investigate their evolution at molecular and ecological levels. Together this will result in unprecedented insight into the biology of LR asymmetry.