

PhD/Postdoc vacancies MPI for Dynamics and Self-Organization

Candidates are being sought for several PhD and post-doctoral positions in the research group on Pattern Formation in the Geosciences, at the Max Planck Institute for Dynamics and Self-Organization, in Göttingen, Germany.



MAX-PLANCK-GESellschaft

There are currently openings for three projects, to start in 2011, or early 2012:

Coffee-ring effect: What is the shape of a dried droplet of wine, coffee, or paint? Typically, in what is known as the coffee-ring effect, the sediment dispersed in a liquid film, or drop, is left preferentially at the edge of the film. Surprisingly, we cannot predict the shape of the profile left in such a deposit, and we lack an understanding of the details of transport within the drying mass. This project will look at the flow of both liquid and solid phases of drying dispersions (colloids of materials such as latex and silica), and attempt to build a coherent model of how a drop or film dries. A series of sophisticated experiments, involving methods such as particle imaging velocimetry and x-ray/neutron spectroscopy, are planned to help understand this seemingly simple problem.

Crack patterns in thin films: In nature, cracks that interact with each other, or their environment, can show surprising order. The polygons of columnar joints (such as at the Giant's Causeway) and the craquelere on pottery or paintings are examples where by observing the crack pattern, we can learn about the conditions under which it formed. This project will attempt to develop an energy-based model of crack paths, and to investigate the dynamics of wavy, curved, and spiral cracks in thin films. As there is no inherent length scale in fracture mechanics, the results of this work could have a broad range of applications, from interpreting satellite images of cracks on other planets, to the self-assembly of crack patterns as a nano-fabrication technique.

Freezing-thaw patterns: This experimental research project will study the development of patterned ground. In peri-glacial regions of the Earth and Mars, effects associated with repeatedly freezing and thawing soils give rise to widespread patterns of circles, stripes, and polygonal networks. The advertised position focuses on experimentally studying freeze-thaw instabilities in porous media such as clays, soils, or colloidal dispersions, with aims to characterize the conditions under which patterns form, to identify the timescale of their dynamics, and to determine the relevant laws controlling which pattern is selected, and what length scales are manifested. Candidates for this position should be open to possible fieldwork, in Greenland or Antarctica.

Further details of these projects can be found on the group website at <http://www.dcf.ds.mpg.de/index.php?id=748>

Applications should include a CV with a list of publications, a one page statement of research interests, and the names of at least two references, and be directed to lucas.goehring@ds.mpg.de.

For a PhD position, a Honors/Masters degree in a relevant discipline (eg. Physics, Chemistry, Engineering, Geology, Applied Mathematics...), is required. For a post-doctoral position, a PhD in a relevant discipline is required. Desirable additional skills for a postdoctoral position include demonstrated experience in fracture mechanics, or colloid chemistry and synthesis.

A good knowledge of English is necessary.

The Max Planck Society is an equal opportunity employer. Women are especially encouraged to apply; handicapped individuals with equal qualifications will be given preferential treatment. Salary is on the German TVöD scale.