Two PhD student positions (100%) in Long-Term Forest Dynamics

The Professorship of Forest Ecology at ETH Zürich is a dynamic interdisciplinary research team that examines both theoretical and applied questions in forest ecology using a combination of empirical and modeling techniques. The overarching aim of the group is to further our understanding of the structure and function of forest ecosystems, with a particular focus on mountain areas such as the European Alps. We offer world-class facilities in a relaxing work atmosphere with ample opportunities for collaboration within and beyond our group.

Forest management is facing multiple challenges in the era of global change. Among others, the de-carbonization of society is likely to lead to a higher demand for forest products, thus rendering adaptive, sustainable resource management an imperative. In the long term, maximum sustainable yield is strongly related to carbon and nutrient cycling and thus soil conditions and their changes. In the context of a project funded by the Swiss National Science Foundation, we investigate the long-term dynamics of managed forests using dynamic models, emphasizing (1) the structural uncertainty in model formulations and (2) the further development of the belowground components of a stand-scale model, i.e. water and carbon/nutrient cycling.

We seek to appoint two PhD students to conduct research on aboveground-belowground interactions in managed forests and to provide projections of their future dynamics.

**PhD Student A** will focus on the formulation of bioclimatic influences on forest dynamics, alternative formulations of soil water dynamics and particularly the representation of drought effects on tree establishment, growth and competition; also, the possible direct effects of soil moisture and drought trajectories on mortality will be investigated. This work will be conducted in close collaboration with scientists from the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL).

**PhD Student B** will focus on a new soil carbon and nutrient turnover model that will be adapted based on existing models from the literature, to be complemented by novel components to rectify deficiencies of existing approaches in long-term applications, including weathering and erosion. This work will be conducted in close collaboration with scientists of the Institute of Terrestrial Ecosystems at ETH and international partners.

**Required qualifications** comprise an MSc degree in forest sciences, environmental sciences, ecology, forestry, landscape ecology, or a related field, with good knowledge of forest ecology and soil science. Experience with the development, testing and application of dynamic models at the stand or landscape scale is a strong asset for both positions. Knowledge of the R software and of the C family of programming languages (C++, C#) is an asset as well. Knowledge of European forest ecosystems is highly welcome. Finally, candidates should have at least basic skills in statistics.

**Starting date** for both positions: 1 April 2020, negotiable within limits

**Duration of appointment:** Maximum of four years.

For more information on the Forest Ecology Group, check its website (http://www.fe.ethz.ch) or contact the group leader, Prof Harald Bugmann (e-mail: harald.bugmann@usys.ethz.ch).
To apply for this position (in English or German), submit a letter (1-2 pages) explaining your interests, your CV, diploma transcripts (BSc/MSc) from which the grades are evident, and the names and addresses (including e-mail) of three reference persons. Applications must be submitted using the online tool, not by e-mail: https://www.jobs.ethz.ch/job/view/JOPG_ethz_RFexOLt5vGkUSHS9c.

Screening of applications will start on 1 January 2020, and applications are accepted until the positions are filled.