

Hannelore Derluyn

Crystallization-induced fracturing of geomaterials



Hannelore Derluyn was appointed as a CNRS researcher to the [Laboratoire des Fluides Complexes et leurs Réservoirs \(LFCR\)](#) of [IPRA](#) in October 2016. She received her Master's Degree in Civil Engineering from the University of Leuven (Belgium, 2006) and her PhD degree from the ETH Zurich (Switzerland, 2012). During her PhD studies, she spent four months as a visiting researcher at Princeton University (USA). Before moving to France, she was a postdoctoral researcher at ETH Zurich and EMPA Dübendorf (Switzerland, 2012-2013) and a research fellow of the Research Foundation – Flanders (FWO) at Ghent University (Belgium, 2013-2016).

At UPPA, Hannelore Derluyn works on crystallization-induced fracturing associated with salt transport and in-pore salt precipitation in geomaterials. She studies the coupled dynamics of transport, crystallization and fracturing in rocks at the pore-scale level by performing in-situ dynamic tests at X-ray and neutron imaging facilities, in collaboration with the [Chair for X-ray imaging](#) and her international network. The imaging experiments on rocks are complemented by optical microscopy work on model pore networks to elucidate phenomena below the spatial and temporal resolution of the X-ray and neutron imaging setups. The quantitative data derived from the image analysis can then be used to enrich computational models, such as a continuous-discontinuous FEM model that was extended for crystallization processes during her PhD, or lattice models as developed at the [Chair for Geomechanics](#). The research further benefits from collaborations with the [Structural Geology Chair](#), the [Chair for Characterization of Petroleum Systems](#), and with LFCR-researchers working on gas hydrates, as the study of gas hydrate formation and dissociation in gas hydrate bearing sediments shows many analogies with salt crystallization in porous media.

To date, Hannelore Derluyn has published 22 SCIE-journal articles. According to Scopus, her work was cited 186 times, resulting in an h-index of 9. She was awarded the ETH Medal for her dissertation and received the Best Reviewer 2015 Award from the journal *Materials*

and Structures. Moreover, she secured her own research funding by personal grants from the Institute for the Promotion of Innovation by Science and Technology in Flanders, the ETH Zurich Co-Fund Program and the FWO, by research projects with industrial partners (e.g. Lafarge), and by research grants from the Paul Scherrer Institute.