

Laudatio for the Award Ceremony of the Prix Schläfli Geosciences 2018 of the Swiss Academy of Sciences (SCNAT) for Dr Alexandre Bagnoud

The Jury of the Prix Schläfli 2018 of the Swiss Academy of Sciences (SCNAT), consisting of PD Dr Naki Akçar (University of Bern), Prof. Dr Philip Brunner (University of Neuchâtel), Dr Pierre Dèzes (SCNAT), Prof. Dr Olivier Graefe (University of Fribourg), Christine Pümpin (University of Basel), Prof. Dr Elias Samankassou (University of Geneva), Prof. Dr Guido Schreurs (University of Bern), Prof. Rolf Tanner (PH Bern), Prof. Dr Marie E. S. Violay (University of Lausanne), and Prof. Dr Werner Eugster

(ETH Zürich, president) has decided to award the prize to Dr Alexandre Bagnoud for testing the hypothesis that subsurface microbial communities might be key for reducing the risk of gas pressure build-up in nuclear waste repositories, and for providing strong evidence that previously unknown genera of autotrophic hydrogen oxidizers reduced gas pressure in an in situ experiment carried out in the Mont Terri Underground Rock Laboratory.

The board of the Platform Geosciences has unanimously decided to award the Prix Schläfli Geosciences 2018 to Dr Alexandre Bagnoud. The dossier of Dr Bagnoud fulfilled all the selection criteria for the Prix Schläfli with flying colours. The submitted paper entitled 'Reconstructing a hydrogen-driven microbial metabolic network in Opalinus Clay rock' is of outstanding quality and was published in Nature Communications, one of the leading open-access journals in natural sciences. The submitted work is a perfect example of an interdisciplinary research project combining microbiology, geochemistry and bioinformatics. The line of research pursued by Alexandre Bagnoud is not only very innovative in academic terms, but also has real potential for practical applications as a way to mitigate the issue of *in-situ* hydrogen release through corrosion of the canisters destined for the long-term storage of radioactive waste in the geological repository in Switzerland. He tested the hypothesis whether subsurface microbial communities could alleviate gas pressure in nuclear waste deposits. Microbial communities driven by autotrophic hydrogen oxidizers belonging to novel genera – that he determined by several rRNA sequencing methods – fuel a deep subsurface carbon cycle that was previously unknown. Opalinus clay formations are foreseen for such repositories, but it is expected that corroding steel containers containing nuclear waste lead to a build-up of gas pressure, thereby questioning the long-term stability of such repositories. The work by Alexandre Bagnoud, which included in situ experiments carried out in the Mont Terri Underground Rock Laboratory in Switzerland, now provides strong evidence that thanks to this feedback with the subsurface carbon cycle the problem of gas pressure build-up may be alleviated substantially.

Dr Bagnoud obtained his MA in biogeosciences from the University of Neuchâtel and was awarded his PhD. degree by the Ecole Polytechnique Fédérale de Lausanne (EPFL) with his study supervised by Prof. Rizlan Bernier-Latmani. He graduated in August 2015 and is now a post-doctoral researcher at the University of Vienna in Prof. Christa Schleper's laboratory.

Prof. Dr Werner Eugster, president of the Platform Geosciences of the Swiss Academy of Sciences (SCNAT)

Award Ceremony, 25 May 2018 before the Delegate Assembly of the SCNAT, Bern



Swiss Academy of Sciences Akademie der Naturwissenschaften Accademia di scienze naturali Académie des sciences naturelles