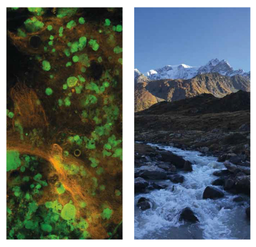
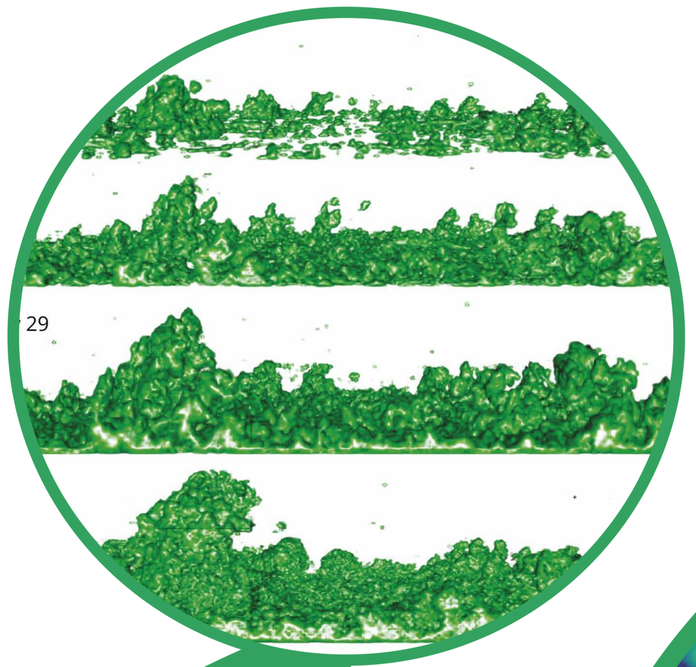


SBER

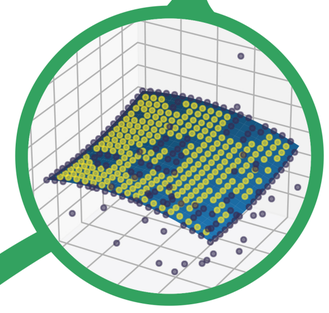
Stream Biofilm and Ecosystem Research Laboratory

EPFL



BACKGROUND & AIMS

Phototrophic biofilms dominate benthic life in many ecosystems. In streams, these biofilms can form conspicuous patterns, the formation of which remains poorly understood. We hypothesize that patterns evolve from hydraulic constraints and biotic processes, where the latter are conducive to enhance fitness of the biofilms.



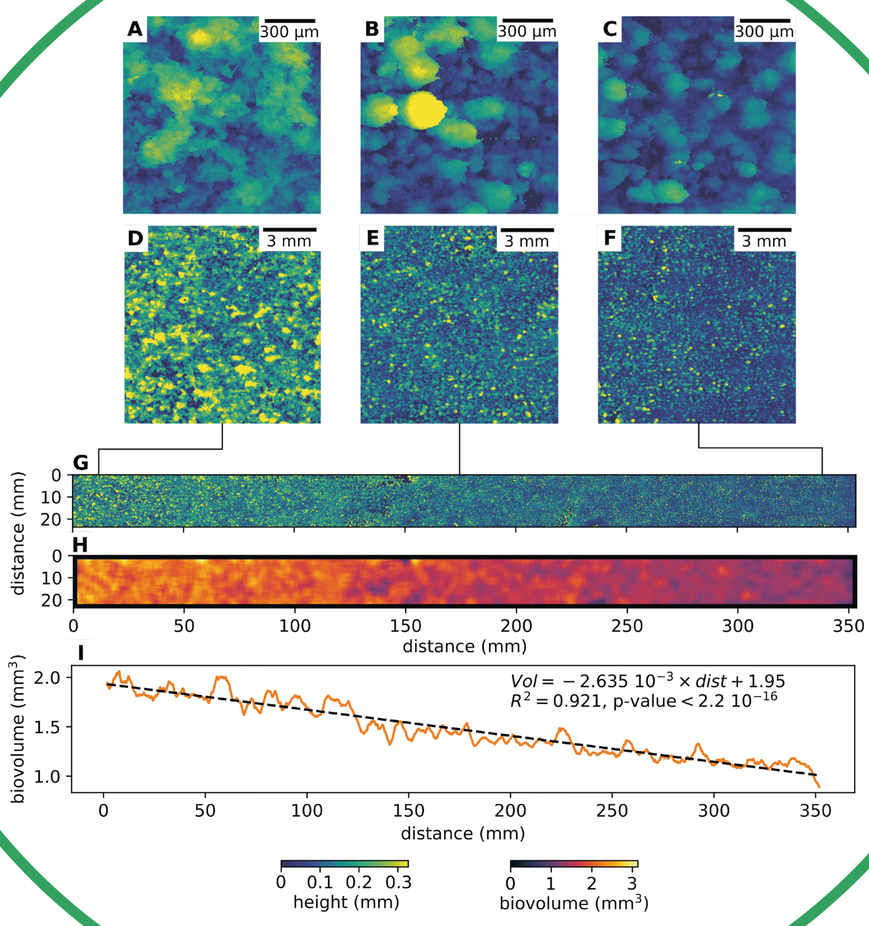
The Morphogenesis of Phototrophic Biofilms

IMPLICATIONS

For the first time, we are able to image phototrophic biofilms at high spatial resolution over a 1m length scale. This will open new research avenues into biofilm dispersal and structural dynamics.

METHODS

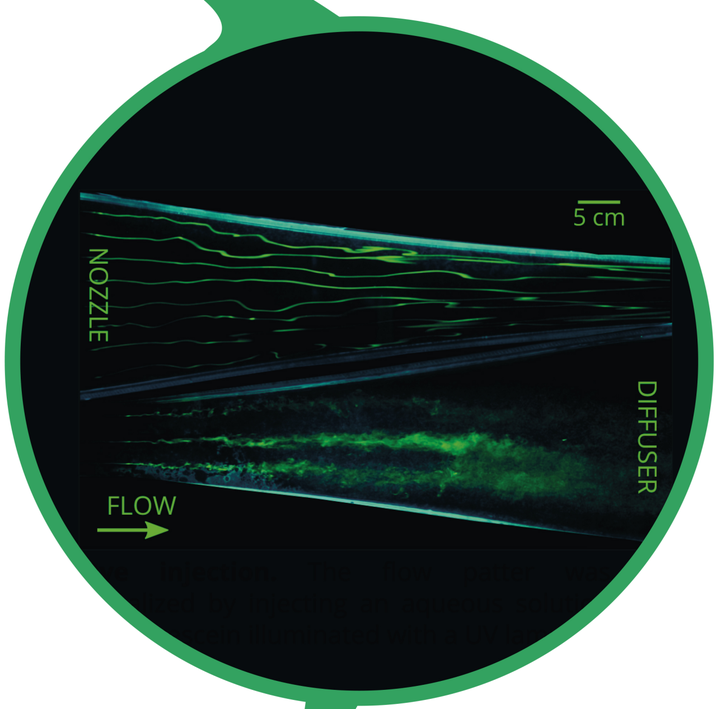
We designed experimental flumes with highly reproducible hydraulic microenvironments. Biofilm morphogenesis is monitored with a sophisticated automated optical coherence tomo-graphy (OCT) system. Advanced image analysis allos us to quantify pattern formation in the various hydraulic microenvironments.



RESULTS

Hydraulic microenvironments along gradients of flow velocity and turbulence lead to gradual changes in biofilm biovolume accumulation. This is evident throughout all stages of biofilm formation.

Local pattern formation appears to be mediated by directional interactions among neighboring biofilm patches.



NOMIS FOUNDATION Creating the Spark

FNSNF Swiss National Science Foundation

MARIE CURIE ACTIONS