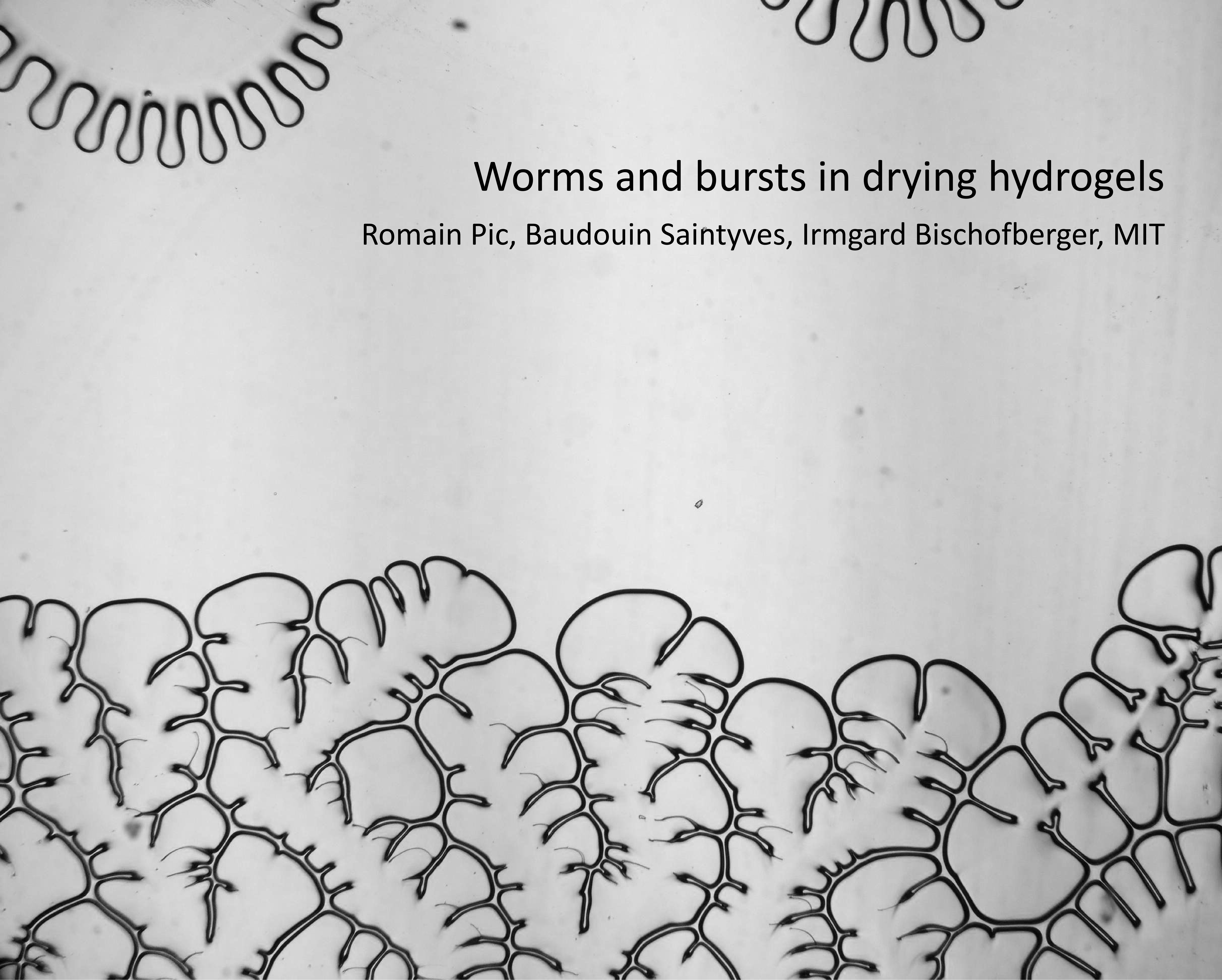


Worms and bursts in drying hydrogels

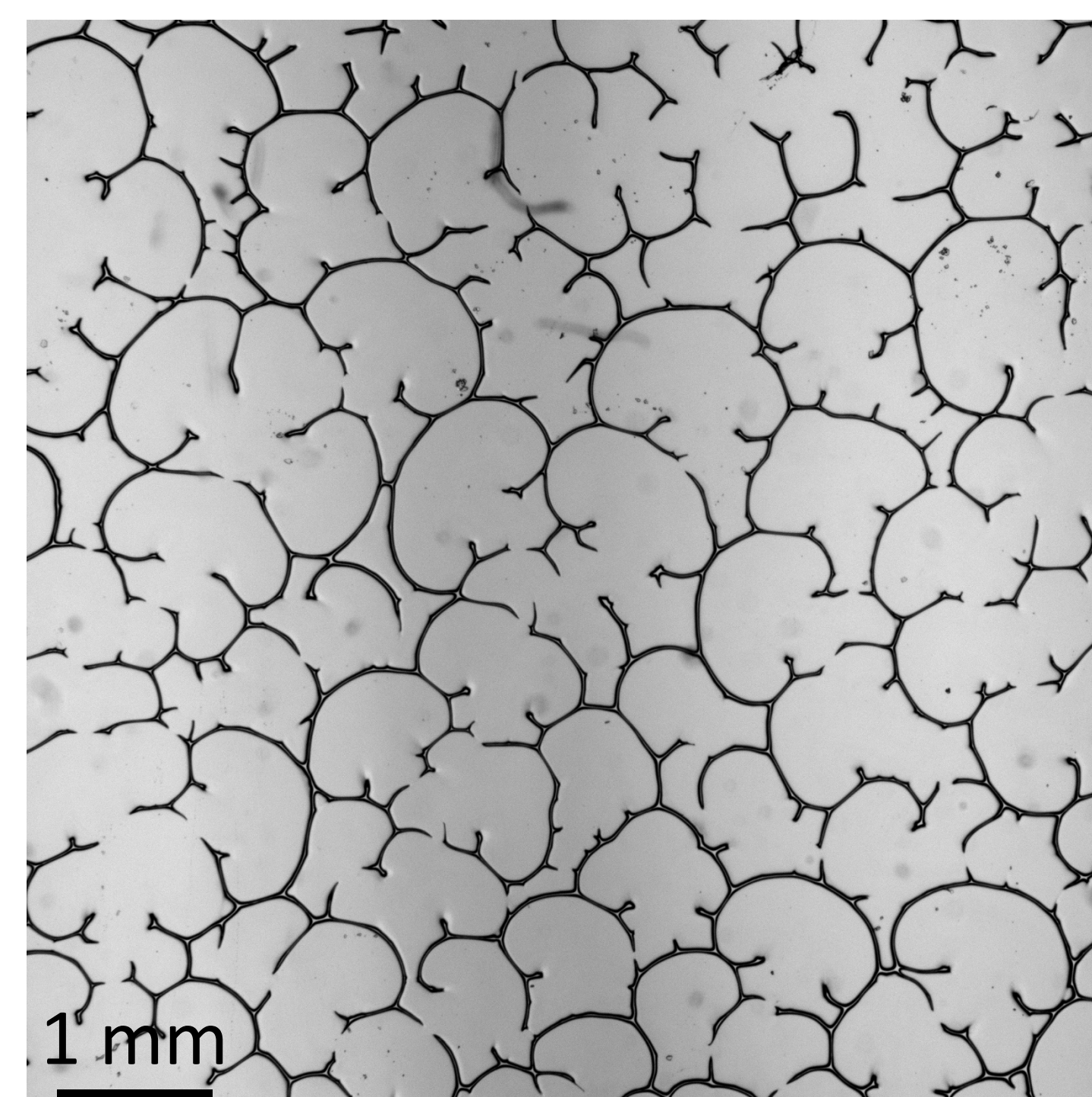
Romain Pic, Baudouin Saintyves, Irmgard Bischofberger, MIT



The evaporation of a solvent from a confined material commonly leads to the formation of straight cracks, as often observed in old paintings or muddy soils. The patterns shown here form very different structures; they emerge during the drying of thin films of hydrogels confined between two glass plates.

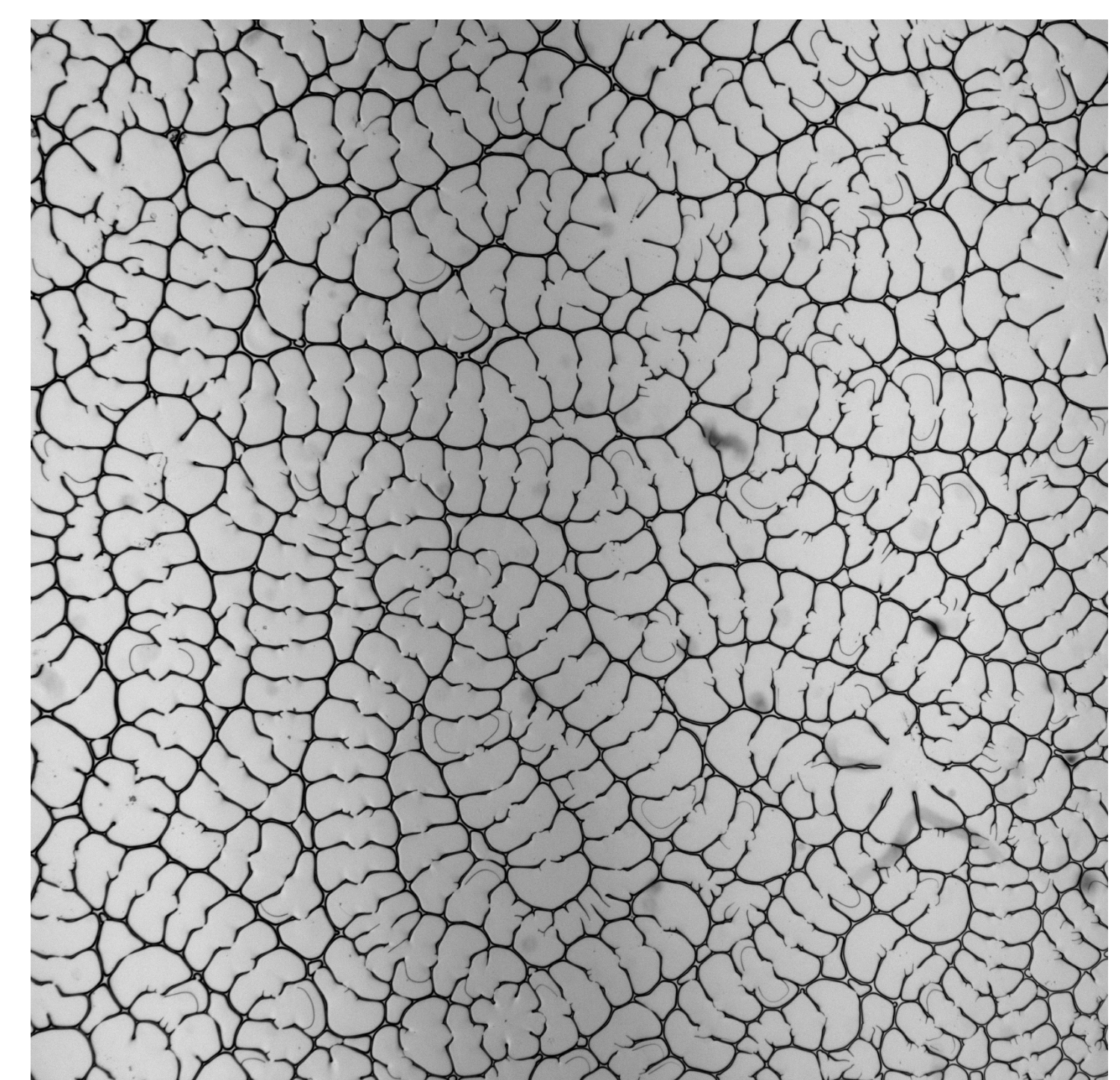
As the water evaporates, stresses build up at the air-gel interface. These stresses get released by intermittent bubble formations, which lead either to the growth of disordered or wormlike patterns, depending on the gel modulus G and the plate spacing b . The bubble size is set by the plate spacing.

Disordered pattern



$G < 50 \text{ Pa}$, $b < 100 \text{ }\mu\text{m}$

Wormlike pattern



$G > 50 \text{ Pa}$, $b > 100 \text{ }\mu\text{m}$