Dynamics of bubble swarms in a turbulent pipe flow

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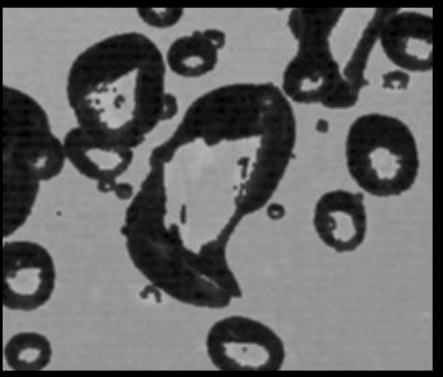
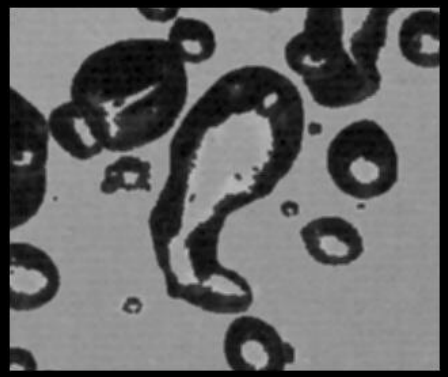
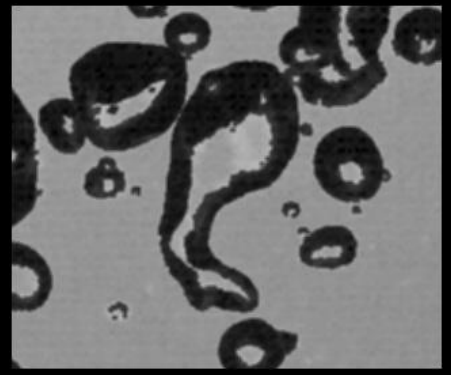
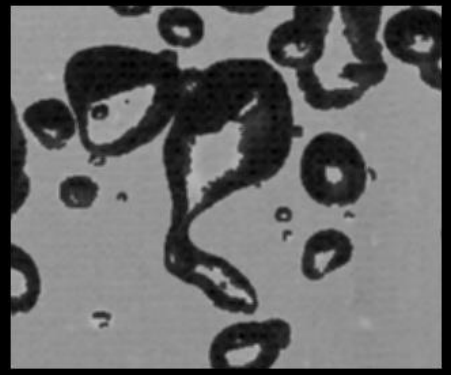
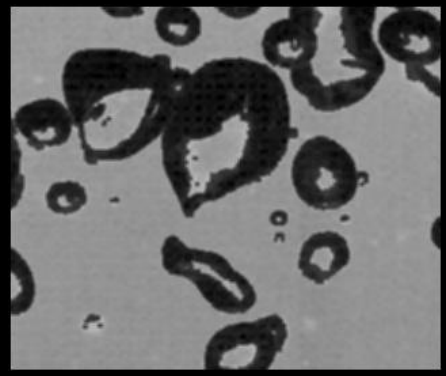

High-speed imaging reveals the deformation and breakup of an air bubble travelling through a turbulent pipe flow in water. The void fraction is of approximately 0.75% and Reynolds number of 88 000.

The breakup process begins with the elongation of the bubble along the vertical. A neck is formed and the bubble undergoes a rapid capillary collapse, resulting in two daughter bubbles of different sizes.

Other bubble interactions such as clustering and coalescence can be observed in the same turbulent pipe flow. Extending this research to other bubbly regimes will shed light on the underlying mechanisms involved.