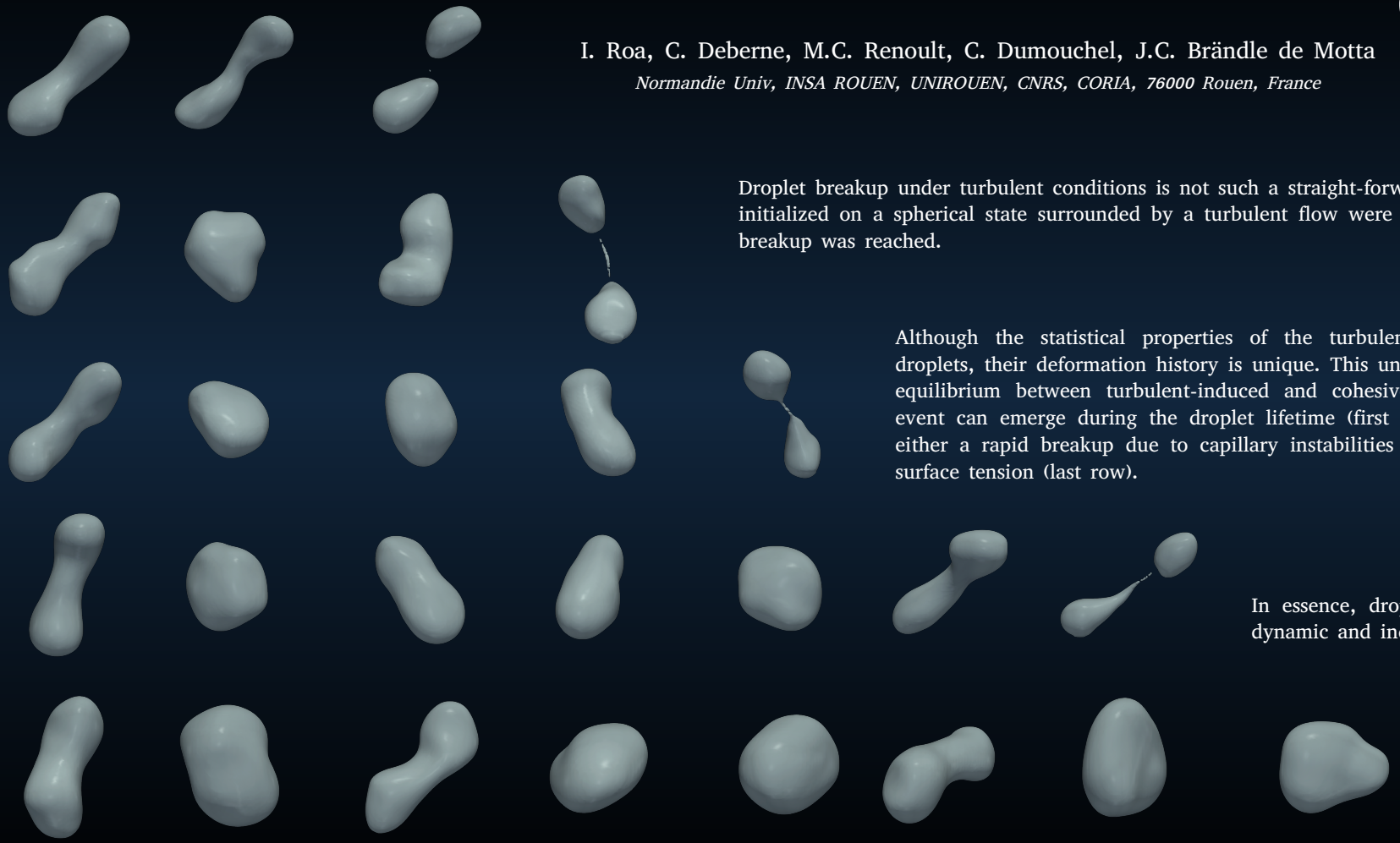
Break or Relax

I. Roa, C. Deberne, M.C. Renoult, C. Dumouchel, J.C. Brändle de Motta

Normandie Univ, INSA ROUEN, UNIROUEN, CNRS, CORIA, 76000 Rouen, France



Droplet breakup under turbulent conditions is not such a straight-forward process. A series of droplets initialized on a spherical state surrounded by a turbulent flow were realized and left to evolve until breakup was reached.

Although the statistical properties of the turbulence are equivalent for all the droplets, their deformation history is unique. This uniqueness arises from the delicate equilibrium between turbulent-induced and cohesive forces. A strong deformation event can emerge during the droplet lifetime (first column). This state can lead to either a rapid breakup due to capillary instabilities (first row) or relaxation due to surface tension (last row).

In essence, droplet breakup in turbulence is a dynamic and individualized process.

Droplet database generated using ARCHER code