Soap Film Experiments in Microgravity

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Four TCD theoretical physics undergraduates have returned from Bordeaux having completed a foam physics experiment in zero gravity with the European Space Agency.

Team Members: David Barrett, Mathew Dolan, Seán Kelly, E.J.Daly

The students flew in a 30 year old Boeing Airbus A300 prototype which performed a parabolic manoeuvre. This involves pulling the plane up to a 47 degree angle at maximum speed before free falling from the sky through 4000 feet. During this drop there is a 20 second period of weightlessness onboard. This microgravity period allowed them to

perform their experiment.

There investigation is the continuation of wire frame experiments conducted by Belgian physicist Plateau in the 1840's. The students formed a soap film in a cubic wire frame and then injected liquid into the Plateau Borders (film intersections) during microgravity. This allowed them to observe the transition from a dry film configuration to a wet configuration. These are the first microgravity experiments of there kind.

The students are studying wet soap films as part of a wider program of foam physics research in Trinity. Wet foams are not well understood as they are nearly impossible to study under gravity because of gravity driven drainage of liquid between the bubbles. Wet foams are important in the materials industry- metallic wet foams have a high strength to mass ratio, 10 times greater than steel.

Every year ESA gives 30 student teams from Europe and Canada this opportunity to experiment in zero gravity. The four TCD students are the first Irish team to be selected by ESA.