

The GK Batchelor Laboratory of Fluid Dynamics

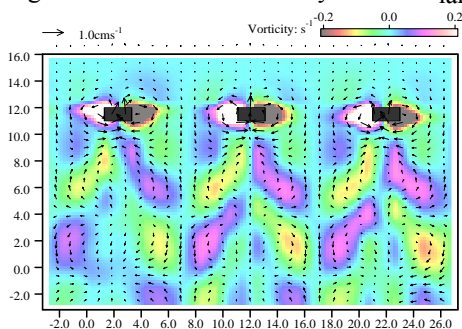
*Dr. S.B. Dalziel, Director of the Fluid Dynamics Laboratory,
Department of Applied Mathematics & Theoretical Physics*

“But I thought this is a maths department!” This is often the response when someone discovers DAMTP has a fluid dynamics laboratory. Since DAMTP first moved to the Press Site in 1964, mathematicians – along with a scattering of physicists and engineers visiting the Department – have got their hands wet deep in the ‘wetting cellar’ of the old University Press building.

For nearly forty years the Laboratory has thrived, despite a lack of adequate drainage, low ceilings, and increasingly cramped conditions. A symbiosis has developed where the interplay between experimental studies and other modelling activities have led to the experiments found in DAMTP being quite different to those found in most other departments. The experiments provide answers to questions that either helps us construct appropriate mathematical models, and provide the data to validate the models. The art is in designing a simple experiment capable of providing a generic question.

The Laboratory is perhaps best known for its work has been geological, geophysical and environmental fluid dynamics. However, experiments spanning nearly the full spectrum of fluid dynamics have been undertaken: from swimming algae to flow through fractal objects; from breaking liquid bridges to spin-stabilised satellites; from microbubbles to crop spraying; from salt fingers to solitary waves.

Some of the questions being asked in the Laboratory are



Time average flow behind a grid generating turbulence in a stratified fluid. (R.C. Higginson & S.B. Dalziel)

practical: How do topography and salinity interact with tidal currents to control the dispersion of pollution from bays, and how is this process related to the flushing of pollutants from our city streets? What governs the crystallisation of magma, or the progress of a pyroclastic flow from a volcanic eruption? What is the effect of wind conditions on buoyancy driven ventilation in a building, and how can we use this to our advantage? Can we control the hydrodynamic instabilities that limit the efficiency of inertially confined fusion? Other questions are more fundamental, but their answers invariably have practical implications: What is the best way to model granular materials? Do we understand the differences between density due to heat or composition from that due to the presence of a suspended second phase? Is mixing sensitive to how we put the energy into the system? How do fluids accommodate mathematical singularities?

When it was founded, the concept of a laboratory in a mathematics department was unique. Since then, many leading mathematics departments have witnessed the success of the Laboratory and have set up one of their own, although none have had the scale or scope of that in DAMTP. With the new facilities at CMS the Laboratory may still be hidden underground, but we anticipate that it will become even more visible to the research community!

The GK Batchelor Fund

We invite you to help establish a fund in the memory of George Batchelor to support experimental work in fluid mechanics.

The world of fluid mechanics will have been greatly saddened by the death of Professor George Keith Batchelor FRS on 30 March 2000. Batchelor will be remembered for many outstanding achievements: in his own fluid mechanics research, for his textbook *An Introduction to Fluid Dynamics*, the establishment of the European Mechanics Committee and EUROMECH Colloquia, and the founding of (and his forty years editing) the *Journal of Fluid Mechanics*.

DAMTP in particular owes a lot to Batchelor: he was instrumental in the founding of the Department in 1959, and remained Head of Department from then until his retirement in 1983. Batchelor was also responsible for establishing the Laboratory. He foresaw an immense benefit to the fluid dynamics community in having the leading theoreticians undertaking (or at least being closely involved with) experiments designed for probing the basic elements of fluid dynamics.

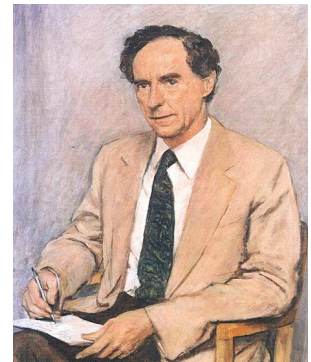
In recognition of his pivotal role in fluid mechanics and in establishing the Laboratory, it has been agreed that the new Laboratory at CMS will be named the GK Batchelor Laboratory of Fluid Dynamics.

We now seek to establish an endowment fund, the GK Batchelor Fund, which will be used to provide vital support new experimental initiatives within the Laboratory. We believe that Batchelor would have seen this proposal as particularly appropriate. Your support will help ensure continuation of the great tradition of research in fluid dynamics in which Batchelor provided such inspiring leadership.

UK and other non-US donors – if you would like to support the GK Batchelor Fund, please contact: Patrick Hawke-Smith, Cambridge University Development Office, 10 Trumpington Street Cambridge CB2 1QA, UK.

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Portrait by Rupert Shephard, 1984.