

1 Preface

Swirling and Swimming in Turbulence was the theme at the 2010 GFD Program. Professors Glenn Flierl (M.I.T.), Antonello Provenzale (ISAC-CNR, Turin) and Jean-Luc Thiffeault (University of Wisconsin) were the principal lecturers. Together they navigated an elegant path through topics ranging from mixing protocols and efficiencies to ecological strategies, schooling and genetic development. The first ten chapters of this volume document these lectures, each prepared by pairs of this summer's GFD fellows. Following on are the written reports of the fellows' own research projects.

This summer's fellows were:

- Michael Allshouse, MIT
- Emma Boland-Thompson, University of Cambridge
- Renske Gelderloos, KNMI, Utrecht
- David Goluskin, Columbia University
- Georgy Manucharyan, Yale University
- Woosok Moon, Yale University
- Kiori Obuse, Kyoto University
- Amanda O'Rourke, Princeton University
- Sam Pegler, University of Cambridge
- Anubhab Roy, Jawaharlal Nehru Centre for Advanced Scientific Research

In 2010 the Sears Public Lecture was delivered by Professor Jim Murray, of Oxford University and the University of Washington. Jim challenged us to use mathematics in real world problems, citing examples from biology and sociology. Specifically, Jim argued how one could exploit mathematical modelling to assist in the prediction of tumour growth, and to gauge the successfulness of marriage partnership. Over a hundred listeners filed into Redfield for the occasion, and we enjoyed refreshments in the evening air afterwards at the back of Redfield.

Neil Balmforth and Jean-Luc Thiffeault acted as the co-directors for the summer (once Jean-Luc's Lectures were over). New GFD Faculty member Colm Caulfield (University of Cambridge) nimbly acted as assistant, as well as putting in a stout performance on the Staff by supervising a good fraction of the fellows. Anders Jensen worked his usual magic in the Lab, and Janet Fields, Jeanne Fleming and Kathy Ponti smoothly ran the program behind the scenes.