

Preface

The fiftieth year of the program was dedicated to **Nonlinear Waves**, a topic with many applications in geophysical fluid dynamics. The principal lectures were given jointly by Roger Grimshaw and Harvey Segur and between them they covered material drawn from fundamental theory, fluid experiments, asymptotics, and reaching all the way to detailed applications. These lectures set the scene for the rest of the summer, with subsequent daily lectures by staff and visitors on a wide range of topics in GFD. It was a challenge for the fellows and lecturers to provide a consistent set of lecture notes for such a wide-ranging lecture course, but not least due to the valiant efforts of Pascale Garaud, who coordinated the write-up and proof-read all the notes, we are very pleased with the final outcome contained in these pages.

This year's group of eleven international GFD fellows was as diverse as one could get in terms of gender, origin, and race, but all were unified in their desire to apply their fundamental knowledge of fluid dynamics to challenging problems in the real world. Their projects covered a huge range of physical topics and at the end of the summer each student presented his or her work in a one-hour lecture. As always, these projects are the heart of the research and education aspects of our summer study.

During the summer we also had a couple of special events, namely the public Sears Lecture given by Geoff Spedding from USC on animal propulsion entitled "Flight at small scales", and a one-day special workshop and celebration in honour of Lou Howard's 80th birthday entitled "Nonlinear excursions". These well-attended events brought together old and new friends and a good time was had by all.

This summer also had its share of unscheduled surprises, but the enthusiasm and tenacity of our fellows was able to overcome all, be it rained-out softball training sessions or advisors that had to disappear abruptly to attend to robbed houses at the other end of the country. At the end it all came together, and the final days were marked by a happy reunion of everyone and a graceful farewell party, despite a somewhat disappointing outcome of the Fellow-Staff softball match.

Special thanks go to a number of people who served to make the program flow smoothly. Jeanne Fleming, Kathy Ponti and Penny Foster all helped run the Walsh Cottage office and performed exceptional administrative work for the many visits and lectures. Jeanne Fleming was responsible for assembling and preparing this volume. Janet Fields helped with all aspects of the academic programs for the fellows and as usual did a superb job.

We extend our sincere thanks to the National Science Foundation for support for this program under Grant OCE-0824636 and to the Office of Naval Research, Processes and Prediction Division, Physical Oceanography Program, under Grant N00014-09-10844.

Oliver Bühler and Karl Helfrich,
Co-Directors