

Preface

The 2012 GFD Program theme was *Coherent structures* with Professors Jeffrey Weiss of the University of Colorado at Boulder and Edgar Knobloch of the University of California at Berkeley serving as principal lecturers. Together they introduced the audience in the cottage and on the porch to a fascinating mixture of models, mathematics and applications. Deep insights snaked through the whole summer, as the principal lecturers stayed on to participate in the traditional debates and contributed stoutly to the supervision of the fellows. The first ten chapters of this volume document these lectures, each prepared by pairs of the summer’s GFD fellows. Following the principal lecture notes are the written reports of the fellows’ own research projects. This summer’s fellows were:

- Cédric Beaume, IMFT, Toulouse
- Vamsi Chalamalla, University of California, San Diego
- Felicity Graham, University of Tasmania
- Yuan Guo, New York University
- Pedram Hassanzadeh, University of California, Berkeley
- Duncan Hewitt, University of Cambridge
- Bevin Maulsby, University of North Carolina
- Rosalind Oglethorpe, University of Cambridge
- Alban Sauret, IRPHE, Marseille
- Srikanth Toppaladoddi, Yale University

In 2012, the Sears Public Lecture was delivered by Professor Howard Bluestein, of the University of Oklahoma on the topic of “Probing tornadoes with mobile doppler radars”. The topic was particularly suitable for the summer’s theme: a tornado is a special examples of a vortex, perhaps the mother of all coherent structures in fluid dynamics. Howie “Cb” showed how modern and innovative measurement techniques can yield valuable information about the formation and evolution of tornadoes, as well as truly amazing images. Over a hundred listeners filed into Redfield for the occasion, and then enjoyed refreshments in the evening air afterwards outside the auditorium.

Charlie Doering and Oliver Bühler initially acted as the co-directors for the summer, with Colm-cille Caulfield ably stepping in to replace Oliver after he had to bow out. A large number of long-term staff members ensured that the fellows never lacked for guidance, and the seminar series was filled by a steady stream of visitors, talking about topics as diverse as how sharks smell and how to slice symmetry. Anders Jensen worked his usual magic in the Lab, dealing inventively with aquarium sand, bentonite and ketchup as well as with more traditional experimental fluids, and Janet Fields and Jeanne Fleming kept the program running smoothly behind the scenes.