

Preface

The fifth Summer Program of the Center for Turbulence Research was held during the four-week period July 5 to July 29, 1994. As in the past summer programs, direct numerical simulation databases were used to study turbulence physics and modeling issues. Thirty participants from nine countries were selected based on their research proposals. They joined eighteen local participants from Stanford and NASA-Ames Research Center who devoted virtually all of their time during the Program to this activity.

Once again the largest group, comprising more than half of the participants, was the turbulent reacting flows and combustion group. We are indeed very pleased to see that the activities and the results from the CTR Summer Programs have made a positive impact on the international combustion community which is reflected in the increased number and caliber of the participants each year. The remaining participants were in three groups: Fundamentals, Modeling & LES, and Rotating turbulence. They made important progress on a variety of problems using a combination of theory and simulation.

For the first time in the CTR Summer Programs, participants included engineers from the U. S. aerospace industry. These participants were exposed to a variety of problems involving turbulence, and were able to incorporate the models developed at CTR in their company codes. They were exposed to new ideas on turbulence prediction, methods which already appear to have had an impact on their capabilities at their laboratories. We believe that such interactions among the practitioners in the government, academia, and industry are the most meaningful way of transferring new technology to industry and of applying new ideas beneficial to industry.

As part of the program, four review tutorials were given on *Physical Models of Turbulent Fine Scales* (Dale Pullin), *Turbulence Issues and Problems Facing the Engine Industries* (Andreja Brankovic), *Small-Scale Behavior in Distorted Boundary Layers* (Seyed Saddoughi), and *Turbulent Combustion* (Kenneth Bray). A number of colleagues from around the world attended the final presentations on July 29 and participated in discussions of the work.

This report contains twenty-five papers that resulted from the 1994 Summer Program. The papers are divided into four groups; each is preceded by an overview. Early reporting of eleven of the projects occurred at the Forty-Seventh Meeting of the Fluid Dynamics Division of the American Physical Society in Atlanta, Georgia, November 20-22, 1994.

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