

Preface

This report contains the 1990 annual progress reports of the Research Fellows and students of the Center for Turbulence Research. It is intended primarily as a contractor report to the National Aeronautics and Space Administration, Ames Research Center. Another report entitled, "Studying turbulence using numerical simulation databases -III," covering the 1990 CTR Summer Program research activities was released earlier this year. In addition, numerous CTR Manuscript Reports were published last year. The purpose of the CTR Manuscript Series is to expedite the dissemination of research results by the CTR staff.

The Center for Turbulence Research is devoted to the fundamental study of turbulent flows; its objectives are to produce advances in physical understanding of turbulence, in turbulence modeling and simulation, and in turbulence control. The CTR staff study a wide range of problems in turbulence; they together with the NASA-Ames scientific staff and Stanford faculty members have formed a critical mass for the study of turbulence.

Last year, in its fourth operational year, CTR had twenty two resident Postdoctoral Fellows and two Sr. Research Fellows, and it supported seven doctoral students and eight short term visitors with stays of one month or longer. Several other doctoral students who are supported by grants from the Air Force Office of Scientific Research and the Office of Naval Research also conduct their research at the CTR. The 1990 CTR Summer Program had twenty seven guest participants from seven countries. Three of the visiting Fellows offered formal courses at Stanford during the academic year. These were *Mixing and Chaos* (J. Ottino), *Hydrodynamic Stability* (W. Criminale), and *Advanced Topics in Turbulence* (J. Mathieu). All were well attended by CTR Fellows, staff, and students.

The reports appearing in the following pages are a brief account of the accomplishments of the CTR Fellows in 1990. They are grouped in the general areas of modeling, combustion, flow physics, experimental studies, turbulence theory, and simulation. The CTR roster for 1990 is provided in the Appendix. Also listed are the members of the Advisory Committee which meets annually to review the Center's Program and the Steering Committee which acts on Fellowship applications.

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