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PREFACE

This volume contains the proceedings of the Workshop on Instability, Transition and Turbulence, sponsored by the Institute for Computer Applications in Science and Engineering (ICASE) and the NASA Langley Research Center (LaRC), during July 8 to August 2, 1991. This is the second workshop in the series on the subject. The first was held in 1989, and its proceedings were published by Springer-Verlag under the title "Instability and Transition" edited by M. Y. Hussaini and R. G. Voigt. The objectives of these workshops are to

- i) expose the academic community to current technologically important issues of transition and turbulence in shear flows over the entire speed range,
- ii) acquaint the academic community with the unique combination of theoretical, computational and experimental capabilities at LaRC and foster interaction with these capabilities, and
- iii) accelerate progress in elucidating the fundamental phenomena of transition and turbulence, leading to improved transition and turbulence modeling in design methodologies.

The research areas covered in these proceedings include receptivity and roughness, nonlinear theories of transition, numerical simulation of spatially evolving flows, modelling of transitional and fully turbulent flows as well as some experiments on instability and transition. In addition, a one-day mini-symposium was held to discuss recent and planned experiments on turbulent flow over a backward-facing step.

There were approximately a hundred participants in the Workshop, one-third of which were LaRC and ICASE scientists; the rest were mainly from universities in the USA and the UK. There were also some participants from US aircraft industries. These participants were divided into eleven groups of five to ten members. (It must be mentioned that the division into groups based on methodology was rather arbitrary and was a matter of expediency.) There were two groups of experimentalists, headed by S. K. Robinson and S. P. Wilkinson; two groups on advanced asymptotics, led by P. Hall and M. D. Salas; three groups on simulation, headed by G. Erlebacher, C. L. Streett and T. A. Zang; a group on receptivity,

led by M. G. Macaraeg; and two groups on turbulence theory and modeling, led by T. B. Gatski and C. G. Speziale, respectively.

These proceedings contain research papers resulting from projects which, for the most part, were begun during the Workshop and completed shortly thereafter, or resulting from earlier research re-examined during the Workshop in light of interactions and discussions. The papers are organized by the original groups, as reviewed and summarized by the group leaders.

It is a pleasure to acknowledge the assistance and cooperation of many LaRC scientists and other logistical staff who contributed to the smooth operation and success of the Workshop. In particular, we thank Douglas Dwoyer for his support and encouragement; we thank Michael Card and Edwin Prior for their continuous assistance; we thank Percy Bobbitt, Dennis Bushnell, Bruce Holmes, William Sellers, Philip Hall, Frank Smith, Mark Morkovin and Eli Reshotko for their tutorials which discussed the research needs and opportunities as well as the state-of-the-art tools; we also thank all the group leaders for their efforts in supervising, reviewing and summarizing the research output of their respective groups; and finally we thank all the participants who made the Workshop a success.

The preface would not be complete without mentioning the assistance of Linda Johnson who took care of the arrangements for the Workshop, Emily Todd who handled the preliminary correspondence for the Workshop as well as the collection and format editing of the manuscripts, Holly Joplin who did an excellent job as the Workshop secretary, Barbara Stewart who typed some of the manuscripts, and Etta Blair who handled reimbursements for the participants. We are pleased to express our sincere appreciation to all of them. Thanks are also due to the staff of Springer-Verlag for their cooperation in bringing out this volume.

M. Y. Hussaini
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CONTENTS

Preface	v
Contributors	xvii
GROUP SUMMARY: EXPERIMENTS	
<i>Stephen P. Wilkinson</i>	1
Controlled Experiments on Resonant Cross-Flow Mode Interactions <i>Thomas C. Corke</i>	4
High Speed Boundary Layer Transition on a Blunt Nose Flare with Roughness <i>Steven P. Schneider and Ivan E. Beckwith</i>	18
SUMMARY: MINI-SYMPOSIUM ON TURBULENT FLOW OVER A BACKWARD-FACING STEP	
<i>Scott O. Kjølgaard and Siva Thangam</i>	28
GROUP SUMMARY: ADVANCED ASYMPTOTICS I	
<i>Philip Hall</i>	37
The Inviscid Instability of a Nonlinear Görtler Vortex State in a Large Mach Number Boundary Layer Flow <i>Nicholas D. Blackaby</i>	41
On the Interaction of Görtler Vortices and Tollmien-Schlichting Waves in Boundary Layer Flows <i>Andrew Bassom and Philip Hall</i>	51
On the Nonlinear Evolution of Large Wavelength Görtler Vortices <i>Meelan Choudhari and Philip Hall</i>	61
Vortex-Wave Interaction in a Strong Adverse Pressure Gradient <i>A. G. Walton, R. I. Bowles, and F. T. Smith</i>	79

GROUP SUMMARY: ADVANCED ASYMPTOTICS II

Manuel D. Salas 93

Ellipticity in the Vortex Breakdown Problem

Stanley A. Berger 96

Inviscid Stability of Hypersonic Strong Interaction
Flow Over a Flat Plate

Norman D. Malmuth 107

Nonseparable Eigenmodes of the Incompressible
Boundary Layer

C. E. Grosch, T. L. Jackson, and A. K. Kapila 127

Spatially-Quasiperiodic States in Shear Flows

Thomas J. Bridges 137

GROUP SUMMARY: ADVANCED STABILITY

Mujeeb R. Malik 147

Effect of Suction on the Stability of Flow on a
Rotating Disk

Manhar R. Dhanak 151

Nonparallel Stability of Rotating Disk Flow Using PSE

M. R. Malik and P. Balakumar 168

Local and Non-Local Stability Theory of Spatially
Varying Flows

Martin Simen 181

Temperature Effects on the Instability of an
Infinite Swept Attachment Line

D. G. Lasseigne and T. L. Jackson 202

Stability of Velocity Profiles with Reverse Flow

M. Gaster 212

Boundary-Layer Transition: Critical-Layer
Nonlinearity in Fully Interactive Resonant Triad

Reda R. Mankbadi 216

Oblique Mode Breakdown in a Supersonic Boundary Layer Using Nonlinear PSE <i>C.-L. Chang and M. R. Malik</i>	231
Discrete Modes and Continuous Spectra in a Mach 2 Boundary Layer <i>P. Balakumar and M. R. Malik</i>	242
On the Stability of Normal Shock Waves <i>P. W. Duck and P. Balakumar</i>	253
GROUP SUMMARY: SIMULATION I	
<i>Craig L. Streett</i>	267
Effects of Inflow Disturbances on Spatially-Evolving Instability in Plane Channel Flow <i>E. M. Saiki and S. Biringen</i>	271
A Spectral Multi-Domain Code for the Navier-Stokes Equations <i>G. Danabasoglu, S. Biringen, and Craig L. Streett</i>	283
A Preliminary Study of Crossflow Transition on a Swept Wing by Spatial Direct Numerical Simulation <i>Ronald D. Joslin and Craig L. Streett</i>	294
Oblique-Wave Breakdown in an Incompressible Boundary Layer Computed by Spatial DNS and PSE Theory <i>Ronald D. Joslin, Craig L. Streett, and Chau-Lyan Chang</i> ..	304
Simulation of Nonlinear Tollmien-Schlichting Wave Growth through a Laminar Separation Bubble <i>C. P. van Dam and S. Elli</i>	311
GROUP SUMMARY: SIMULATION II	
<i>Thomas A. Zang</i>	323
Reynolds Stress Budget in a Transitional Channel Flow <i>Surya P. G. Dinavahi and Thomas A. Zang</i>	327

Outgoing Acoustic Waves in an Unstable Supersonic Laminar Boundary Layer over a Flexible Surface <i>Abdelkader Frendi, Lucio Maestrello, and Alvin Bayliss</i>	337
On the Non-Uniqueness of the Parallel-Flow Approximation <i>C. David Pruett, Lian L. Ng, and Gordon Erlebacher</i>	344
Channel Flow Transition Induced by a Pair of Oblique Waves <i>P. J. Schmid and D. S. Henningson</i>	356
The Formation and Growth of a Hairpin Vortex <i>Bart A. Singer</i>	367
Aspects of Laminar Breakdown in Boundary-Layer Transition <i>Thomas A. Zang</i>	377
GROUP SUMMARY: SIMULATION III <i>Gordon Erlebacher</i>	389
Instability of Wall-Bounded Compressible Reacting Mixing Layers <i>Dongshin Shin</i>	393
Stability of High Speed Compressible Rotating Couette Flow <i>F. Hatay, S. Biringen, and G. Erlebacher</i>	404
GROUP SUMMARY: RECEPTIVITY <i>Michele G. Macaraeg</i>	417
Effect of Leading-Edge Geometry on Boundary-Layer Receptivity to Freestream Sound <i>N. Lin, H. L. Reed, and W. S. Saric</i>	421
Effect of Nose Bluntness on Leading-Edge Receptivity <i>P. W. Hammerton and E. J. Kerschen</i>	441
Leading-Edge Receptivity to a Vortical Freestream Disturbance: A Numerical Analysis <i>Thomas A. Buter and Helen L. Reed</i>	452

Nonlocalized Receptivity to Vortical Free-Stream Disturbances <i>J. D. Crouch</i>	470
GROUP SUMMARY: TURBULENCE THEORY	
<i>T. B. Gatski</i>	481
Assessment of Two-Equation Turbulence Models for Predicting Transitional Flows <i>Ridha Abid</i>	485
Proper Orthogonal Decomposition Based Turbulence Modeling <i>T. B. Gatski and M. N. Glauser</i>	498
Detonation-Turbulence Interactions <i>T. L. Jackson, M. Y. Hussaini, and H. S. Ribner</i>	511
Spectral Laws for the Compressible Isotropic Turbulence <i>Bhimsen K. Shivamoggi</i>	524
Nonlinear Wave Interactions in Compressible Turbulence <i>B. K. Shivamoggi and S. S. Sarkar</i>	535
A Comparison of Turbulence Models for Homogeneous Shear Flows with Longitudinal Curvature <i>D. P. Tselepidakis, T. B. Gatski, and A. M. Savill</i>	544
GROUP SUMMARY: TURBULENCE MODELING	
<i>Charles G. Speziale</i>	559
The Role of Vortex Stretching in Turbulence Modeling <i>Peter S. Bernard, Siva Thangam, and Charles G. Speziale</i> ..	563
Application of Second Moment Closure Models to Complex Flows: Part I - Wall Bounded Flows <i>A. O. Demuren and S. Sarkar</i>	575
Large-Eddy Simulation of Supersonic, Wall-Bounded, Turbulent Flows <i>Linda D. Kral and Thomas A. Zang</i>	589

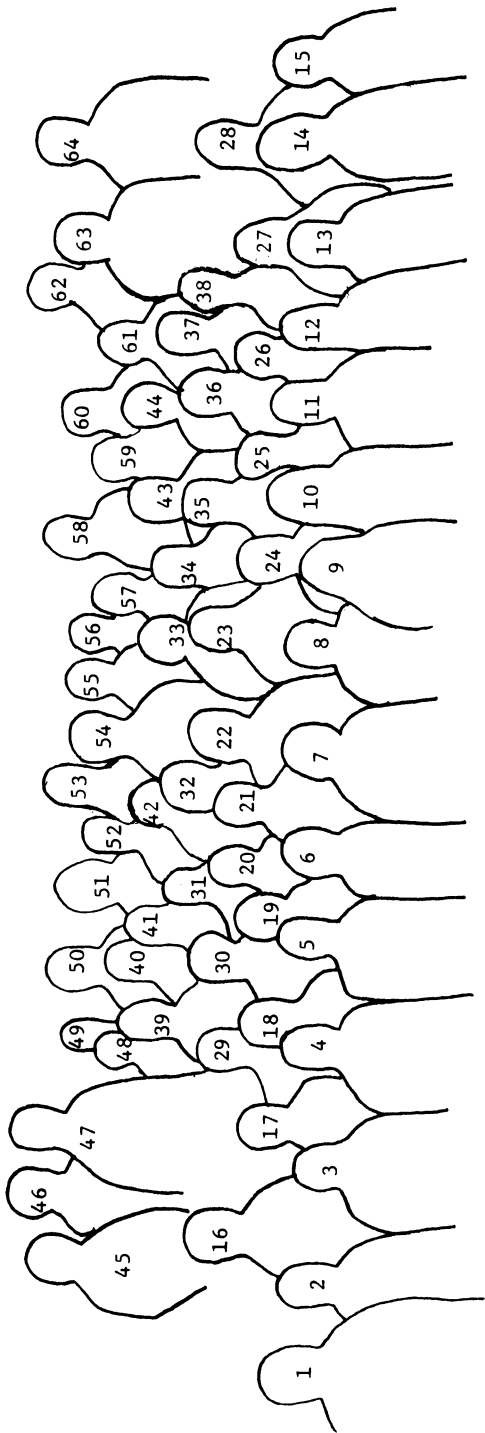
Turbulent Flow Past the Backward-Facing Step: Modeling and Computations <i>Siva Thangam</i>	600
A $k - \epsilon$ Calculation of Transitional Boundary Layers <i>Z. Yang and T. H. Shih</i>	611

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| 4. Nabil El-Hady | 36. Stanley Berger | 52. Thomas Corke |
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| 14. Jeffrey Crouch | 46. C. P. van Dam | 62. Keith Blodgett |
| 15. Thomas Buter | 47. Nay Lin | 63. Mark Glauser |
| 16. Meelan Choudhari | 48. Ayodeji Demuren | 64. Thomas Jackson |
| 17. Gordon Erlebacher | | |
| 18. Holly Joplin | | |
| 19. Mark Morkovin | | |
| 20. Manhar Dhanak | | |
| 21. Bart Singer | | |
| 22. Chester Grosch | | |
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