

## Preface

This Special Volume consists of selected papers from the Conference on Bluff Body Wakes and Vortex-Induced Vibrations, held in Costa do Sauipe, Bahia, Brazil, during the period 12–15 December 2007. The present Conference (BBVIV-5) was the fifth in the series, following on from the Forum on Advances in the Understanding of Bluff Body Wakes and Vortex-Induced Vibrations (BBVIV-1), which was part of the 1998 ASME-FED Summer Meeting in Washington, DC, USA; the IUTAM Symposium on Bluff Body Wakes and Vortex-Induced Vibrations (BBVIV-2) held in Marseille in June 2000; and the Conferences on Bluff Body Wakes and Vortex-Induced Vibrations (BBVIV-3 and BBVIV-4) held in Port Douglas, Queensland, Australia, in December 2002, and on Santorini Island, Greece, in June 2005, respectively. This series of conferences is designed to provide a stimulating and constructive forum for researchers specializing in the areas of flows around bluff bodies that are either fixed or undergoing vortex-induced vibrations (VIV). The event consisted of single sessions including invited talks with ample time outside the formal sessions for participants to meet in a convivial atmosphere.

The papers in this volume were selected by the Scientific Committee from amongst the oral presentations at the Conference and have all been peer-reviewed. The conference attracted 86 participants from 12 countries, including many of the most active researchers in the field. The meeting took place over four days and consisted of single plenary sessions with 7 keynote speakers, 40 oral presentations, and 21 poster presentations. A total of 87 abstracts were received and reviewed by the Scientific Committee and the Chairmen. It is believed that the high level of the standard of the presentations and the science set at the previous four conferences was maintained.

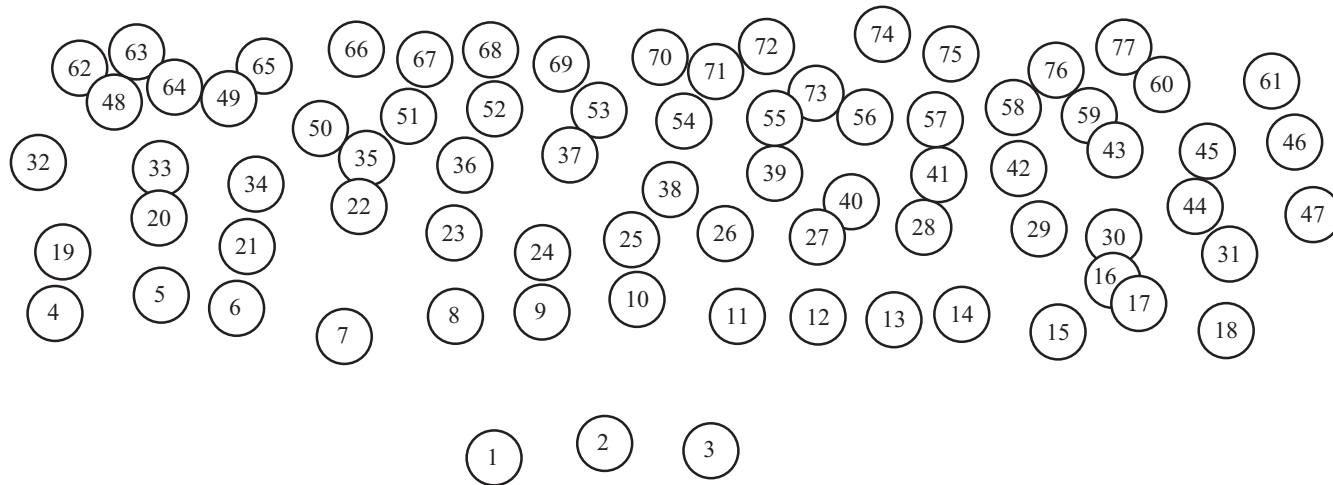
A full set of papers, of both oral and poster presentations, was provided to each participant at the conference site – a detailed list is provided below. The presentations were divided approximately equally into the two conference topics.

- Bluff Body Wakes (21 talks of 20 min, 11 poster presentations) including special sessions on: Spheres; Stability and Ginzburg–Landau Analyses: Multiple Cylinders
- Vortex-Induced Vibration (19 talks, 10 posters) including special sessions on: Controlled Vibration; Risers; Multiple Cylinders; Inclined Cylinders and Suppression

In the Conference, bluff body wakes comprised those from circular cylinders, spheres, square cylinders, rectangular cylinders, cones, inclined cylinders, tube bundles, and even a study of the flow leading to vibrations of a Möbius strip in free fall. The Conference involved detailed investigations on the free dynamics of both bubbles and rising or falling spheres, where new modes of vibration and vortex formation were presented. Interactions between spheres were discussed, as well as analyses of the wake stability of axisymmetric bodies, including an excellent review of the global stability of wakes, and the use of Ginzburg–Landau equation in these flows. Stability of wakes in general was a subject of interest in a number of papers. The physics of temporally and spatially evolving shear layers, in general and under the influence of forcing, was discussed. An unusual but significant new study was the flow of a gravity current past a submarine pipeline, which had particularly interesting results.

Investigations were presented of multiple cylinder wakes, including several papers on the interactions between tandem bodies, and the effects on VIV of interference from other bodies, as well as from splitter plates. In fact, not only were splitter plates (rigid and flexible) studied for stationary bodies, but also some very interesting studies were contributed which showed dramatic reduction in vibration for a cylinder with judicious choices of dynamic or fixed splitter plate configurations. One of the keys to reducing VIV is also reducing drag at the same time, and this was achieved effectively. The classic study of straked bodies was also a theme in the Conference. Dynamics of riser tubes were an obviously important topic, and were well discussed in several seminars. The statistics of the forces and dynamics of risers was another important subject receiving attention. Modeling of VIV was investigated. Finally, a promising area has arisen, because of the very high resolution now possible in both experiment and simulation; namely, the understanding and prediction of free vibration based on extensive controlled vibration studies. Although this concept has a reasonably long history, it is only now that the correspondence between predicted and measured resonance is close, so long as the relevant non-dimensional parameters are carefully matched.





1—Julio Meneghini, 2—Charles Williamson, 3—Thomas Leweke, 4—Benjamin Lévy, 5—Bruno Carmo, 6—Adelaide De Vecchi, 7—Sophie Goujon-Durand, 8—Eduardo Wesfreid, 9—Ricardo Franciss, 10—Celso Morooka, 11—Clóvis Martins, 12—Érico Santos, 13—Sanjay Mittal, 14—Jasmine Lee, 15—Celso Pesce, 16—Cristina Borba, 17—Regina Zemella, 18—Ivone Margarido, 19—Beatriz Schettini, 20—Gustavo Assi, 21—Susan Swithenbank, 22—Eckart Meiburg, 23—Elmer Gennaro, 24—Claudia Dos Santos, 25—Antonio Fernandes, 26—Lauro Silveira, 27—Leonidio Buk, 28—Adriano Axel, 29—André Fujarra, 30—Jacqueline Mikahil, 31—Silvia Bonassa, 32—Leandro Pinto, 33—Jorge Silvestrini, 34—Rémi Violette, 35—Lisa Prahll, 36—Nicholas Kevlahan, 37—Raphael Aquilino, 38—Md. Mahbub Alam, 39—Daniel Carvalho, 40—Steven Dong, 41—Rita Lopes, 42—Rafael Gioria, 43—Octavian Frederich, 44—Pedro Lavinas, 45—Guilherme Franzini, 46—Alexandre D’agostini, 47—Efstathios Konstantinidis, 48—Richard Willden, 49—Mike Graham, 50—Serpil Kocabiyik, 51—Aristeu Silveira, 52—Tim Morse, 53—Halvor Lie, 54—Cynthia Matt, 55—Hideyuki Suzuki, 56—Bartosz Protas, 57—Olivier Cadot, 58—Matt Horowitz, 59—Kunihiko Taira, 60—Jean-Marc Chomaz, 61—Fábio Alves, 62—Richard McSherry, 63—Lambros Kaiktsis, 64—Stavroula Balabani, 65—Valéria Rego, 66—Peter Bearman, 67—Marcelo Medeiros, 68—Jacques Magnaudet, 69—Hassan Nagib, 70—Kim Vandiver, 71—Marcos André, 72—Paulo Jabardo, 73—S.J. Chetan, 74—Enrique Casaprima, 75—Ivan Korkischko, 76—Paolo Luchini, 77—Esteban Gonzalez.

Approaches to all the above problems at the Conference were not only experimental, but further important strides were taken towards simulation or modeling of many of these complex flows, at ever-higher Reynolds numbers, and many theoretical analyses were undertaken. All the approaches yielded new understandings of the wakes and fluid–structure interactions. From the meeting, it was clear that the topic of bluff body wakes and vortex-induced vibration continues to be motivated by many industrial applications and natural flow phenomena. The analytical, experimental and computational approaches to these wake and VIV problems have moved forward significantly since the last Conference (BBVIV-4) in Santorini Island, Greece, but it is quite evident that a great deal remains to be done to understand these varied flows and phenomena. We all left the Conference re-invigorated and excited to push forward our research programs scientifically.

The Invited Speakers delivered particularly impressive and interesting presentations, starting with “Opening Speaker” Franz Hover (MIT, USA), who presented new work on the subject of statistical tools in VIV. In fact, his presentation was delivered a day late, as he had difficulty in visa issues trying to leave Boston, and he only arrived in sunny Brazil due to the immense long-distance charm of Julio Meneghini in communicating with high-level Brazilian officials. At the Conference, we were extremely pleased to have Jean-Marc Chomaz (Ecole Polytechnique, France) present some of the latest theoretical work on global stability analysis. Mike Graham and Peter Bearman (both from Imperial College, England) made a formidable pair leading a highly energetic and numerous group from Imperial College. Mike Graham and Kim Vandiver (MIT, USA) gave impressive lectures concerning marine riser and flexible cylinder hydrodynamics. This year, we had a brilliant seminar from Jacques Magnaudet (IMFT, Toulouse, France), concerning the dynamics of bubbles, which is a subject with a strong intersection with vortex-induced vibration. Eckart Meiburg (UC Santa Barbara, USA) and his group gave presentations highlighting the flow around marine pipelines in the presence of gravity currents, and this new work has been followed up by several of their papers which have been published since the Conference. The invited contributions were ably concluded with the excellent seminar from José Eduardo Wesfreid (ESPCI, Paris, France), who discussed forcing in wakes, shear layers and boundary layers. One should also take note of all the co-authors of these Invited Speakers at the head of the published papers found in this volume.

As has been the nature of all of these BBVIV Conferences, much of the stimulus for holding this series of conferences has come from the support of the Ocean Engineering Division of the US Office of Naval Research, monitored by Dr. Tom Swain. He has encouraged much research in this area, and also enabled the provision of funds for the Conference and the proceedings, in conjunction with Jim Pitton of the US Office of Naval Research Global.

The Conference was held at a resort hotel complex on the immensely beautiful coastline of Costa do Sauípe, Brazil, near to the city of Salvador. The city’s architecture, its people, and its “favelas” were totally fascinating, and so the tourist company by the name of “BeHappy” organised on Thursday a wonderful bus trip for the participants to appreciate our surroundings outside the confines of the resort. The Conference venue was right on the beach, whose white sands and palm trees stretched into the distance, while the consistent warm winds through day and night brought a continuous breaking of waves onto the beach, even in the sunshine of the early morning. Again in keeping with fluid–structure interactions at these Conferences, a growing group of us joined the BBSC (Bluff Body Surfing Club), initiated by Club President Jean-Marc Chomaz and Club Treasurer Rémi Violette. Our number grew as the days progressed. Towards the end of the Conference, the international club members discovered a number of boogie boards which aided our early morning experimental work prior to the delicious breakfasts and seminars in the hotel. Despite the early assurances of Co-Chairman Julio, we were not able to use aerodynamics on the water, and so our choice of Capri, Italy, for the next Conference, will definitely involve such aero-hydrodynamic interactions. At the Conference Reception, Julio introduced us all to “caipirinha”, which also played a central part during the gorgeous banquet, held on the final evening of the Conference. The final dinner was situated outside in the night air, next to the beach and next to the warm wind and breaking waves, and constituted a beautiful and fitting end to our Conference. All participants came away from the meeting in Costa do Sauípe with both the intellect and the senses stimulated, and with new insights into wakes and VIV.

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