Preface

Recent Advances in Turbulent Combustion

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As capabilities to compute the structure of turbulent flames evolve, additional complexities are addressed in the gradual approach towards enabling full calculations of flows in practical combustors. This shall involve details of the atomization of sprays, droplets dynamics and evaporation, mixed-mode combustion as well as accounting for instabilities and the formation of pollutants. The contributions contained within this Special Volume span this entire spectrum from dense to dilute sprays and from premixed to lifted partially premixed and non-premixed flames. Papers originating from the Eighth Mediterranean Symposium on Combustion which was held in Cesme, Izmir, Turkey in September 2013 are extended and revised before inclusion in this Special Volume entitled “Recent Advances in Turbulent Combustion”.

At least three areas of research are colluding to bring about these advances: advanced experiments, large eddy simulations (LES) and direct numerical simulations (DNS). It is remarkable that all the contributions included in this Special Volume address LES issues either separately or in conjunction with experiments or DNS. Conditional moment closure, linear eddy modelling, flamelets with the G-equation are some of the sub-grid-scale approaches employed to model combustion and the benefits of each method will gradually evolve as LES matures. In resolving transient processes, methods of pulsing the flows are implemented for lifted flames and decomposition techniques are employed to resolve modes of instabilities.

All papers published in this Special Volume were subjected to the same rigorous peer review process as normal submissions to the Journal. It was therefore independent from the

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review of the conference submissions, which was used only in order to select the authors that were invited to submit a paper for this volume. The Guest Editors are grateful for the opportunity to publish this Volume which makes a substantial contribution in advancing the field of turbulent combustion of gaseous as well as liquid fuels.