Preface

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Turbulent combustion continues to challenge modellers as well as experimentalists despite the significant advances that have been made recently particularly with respect to non-premixed flames. The objective is to develop capabilities to compute the structure of turbulent flames spanning the entire regime space from premixed to non-premixed, from thin flamelets to broad and distributed reaction zones and from fully burning conditions until close to blowoff. Many issues are yet to be overcome and these include understanding the nature of transient processes, resolving the interaction between turbulence and chemistry and modelling counter-gradient and gradient fluxes. These topics are addressed in this Special Volume on Turbulent Combustion that publishes selected extended and revised papers originating from the Seventh Mediterranean Symposium on Combustion, which was held in Sardinia, Italy in September 2011.

It is evident that Large Eddy Simulation (LES) is gradually becoming a very powerful tool for computing the structure of turbulent premixed, stratified, partially premixed as well as non-premixed flames and a few papers in this Volume are dedicated for the development of relevant (LES) combustion models for the sub-grid scale. Direct Numerical Simulations will remain an extremely useful tool for the generation and validation of physical sub-models and detailed chemical kinetics are now used in most calculations. The interaction between modellers and experimentalists is a key feature of many papers presented in this volume and this approach is now being adopted to advance the calculations of spray flames as demonstrated in this issue.

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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 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.