Preface

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In October 2008 a conference was organized with the topic “DNS and LES of reactive flows”. The research papers contained in this Special Issue are original contributions to this topical field of combustion that were first presented at this conference in the southern part of the Netherlands, characterized as:

“The location is ideal: just outside Maastricht, set in magnificent parkland with ponds. The surroundings are peaceful and unique. You can decide to cycle into town or spend a lazy day lounging in the bar. Whatever you want—it’s entirely up to you. There are splendid function rooms for meetings or a celebration, tastefully and stylishly furnished. Nothing here is standard fare—everything is unique. The quality and the passion for excellence shine through.”

This was the setting of the event, as quoted from the website of the venue; Vaeshartelt Castle near Maastricht, The Netherlands. Indeed it was a very good location for a nice 3-day conference on numerical combustion that was organized by the Combustion Technology Group of Eindhoven University of Technology (TU/e) in the period of October 22 to 24, 2008. The conference started on Wednesday at noon, with a lunch at which one participant (who just became a full professor at Cambridge University) remarked “this is now already a high quality meeting” and ended on Friday early in the afternoon. Besides the sessions, on Wednesday evening attendees had a visit to the city of Maastricht and on Thursday evening there was a conference dinner in the castle. The meeting was supported by ERCOFTAC and COST Action P20: LESAID. For the latter we would like to thank Bernard Geurts for the extended help he provided. The organization was carried out by Marjan Dijk (secretary), Philip de Goey (chairman), Bart Somers, Jeroen van Oijen and Rob Bastiaans (treasurer).

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Besides the venue, the basis of this conference consisted of 29 presentations and 10 posters, for 64 attendees of which there were six invited lecturers. The selection of the papers was performed by a scientific committee consisting of Christian Angelberger, Stewart Cant, Bernard Geurts, Bart Merci, Dirk Roekaerts, Dominique Thévenin, Ananias Tomboulides and Luc Vervisch. Furthermore high-quality keynote lectures were given by pioneers in the field; Stewart Cant, Dan Haworth, Jackie Chen, Luc Vervisch, Steve Pope and Christian Angelberger.

The conference was a podium for researchers practicing and investigating DNS and LES methods for reactive flows in particular. This was mainly down to earth combustion but there was also a contribution on supernovae. In this sense the present conference was a nice addition to the more broadly oriented and also highly valued DLES conference series.

At the conference many new results were presented using state-of-the-art methods and beyond, i.e. several new approaches were proposed and tested. Different combustion regimes were considered, for different fuels as well, from premixed to non-premixed flames, (auto-)ignition, mild oxidation, multiphase combustion of sprays and DDT phenomena. Interactions with acoustics and radiation and real world applications, like internal combustion engines and gas turbine combustion, were presented together with analyses of experimental data for calculations. Many studies involved large scale super-computer resources, as used at an ever increasing rate, not only for theoretical configurations.

Documentation of the results presented at the conference is provided in a very limited way by the book of abstracts. For high quality contributions that are important to the community, participants were given the opportunity to publish their work in a special issue of *Flow, Turbulence and Combustion* exclusively connected to this conference. Originally there were 16 contributions for this special issue of which 10 of them could meet the standards as provided by the review process for this journal, for which Luc Vervisch is thanked in assisting the guest editor when needed. These 10 papers are contained in this issue which is organized such that the segregation in the title of the conference is reflected in the order of the papers; the first five papers are more related with DNS, followed by a paper on chemical reduction after which four papers appear that are more oriented on LES. Within this framework the more fundamental papers appear first and practical contributions including those with interactions appear later.

The editor believes that the current issue is a valuable contribution to the field of combined effects of flow, turbulence and combustion with a special eye on numerical techniques defined by DNS and LES and hopes that also for this volume it holds that “the quality and the passion for excellence shine through”.

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