



5th Announcement: Deadline for Early Registration is Approaching!!

Present Status

Review of the full papers received is nearing conclusion. To date (July 18, 2014), 51 full papers have been received; 14 papers have been withdrawn; and just 1 paper is still missing. Of those to hand, 18 papers have been delivered in final form, and 33 in draft form. Throughout, the Organising Committee has insisted on a full paper review before final acceptance and inclusion in the programme; this to keep standards high.

Scope

The Workshop is intended to represent a forum whereby numerical analysts and experimentalists can exchange information in the application of Computational Fluid Dynamics (CFD) and Computational Multi-Fluid Dynamics (CMFD) to Nuclear Power Plant (NPP) safety and design issues. The workshop will embody both state-of-the-art (single-phase and multi-phase) CFD applications and new experimental data explicitly designed for CFD validation. Emphasis will be placed in the following areas:

- Single-phase and multi-phase CFD simulations with a focus on validation in areas such as: single-phase and multi-phase heat transfer, free-surface flows, direct contact condensation, and turbulent mixing. These should relate to NPP-relevant safety issues, such as pressurized thermal shock, critical heat flux, pool heat exchangers, boron dilution, hydrogen distribution in containments, thermal striping and fatigue, and/or advanced design concepts, such as fuel configurations, passive safety, design optimization, etc. The use of error quantification, and the application of Best Practice Guidelines (BPGs), will be scrutinized in the paper review process. Some discussion of Uncertainty Quantification (UQ), however primitive, is also encouraged.
- The release of new experimental data suitable for CFD or CMFD validation, is also strongly encouraged. These data should include local measurements, using, for example, multi-sensor probes, laser-based

techniques (LDV, PIV or LIF), hot-film/wire anemometry, digital imaging, or other advanced measuring techniques. Papers should include details of the initial and boundary conditions — necessary for any subsequent CFD simulation — and a discussion of measurement uncertainties and error bounds. Papers based on experiments not fulfilling these criteria are likely to be rejected.

Background

The last two decades have witnessed an increasing use of 3-D CFD and CMFD simulation techniques in nuclear reactor technology, in recognition of the fact that a number of important thermal-hydraulic phenomena cannot be predicted to the required accuracy and spatial resolution using traditional one-dimensional system analysis codes.

CFD codes contain empirical models for simulating turbulence, heat transfer, multi-phase interaction and chemical reactions. Such models must be thoroughly validated (against experimental data) before they can be used with confidence in nuclear reactor applications. The validation process can only be justified by comparing model predictions against trustworthy test data. However, reliable model assessment requires CFD simulations to be undertaken with full control over numerical errors and input uncertainties.

These requirements prompted a joint OECD/NEA–IAEA initiative to form Writing Groups of experts with the specific task of addressing the maturity of CFD codes for NPP applications, in particular to (i) set down Best Practice Guidelines (BPGs) for the use of CFD simulation techniques in reactor technology, (ii) to document the validation database on which the level of maturity of CFD codes may be judged, and (iii) to catalogue the extensions needed to current CFD codes to enable them to perform trustworthy multi-phase simulations. The CFD4NRS series of workshops was created to advance the fulfilment of these objectives.

Keynote Speakers

Five keynote lectures at the CFD4NRS-5 Workshop will be given by distinguished guests:

1. Michele Andreani, PSI, Switzerland
Synthesis of results of the OECD-PSI blind benchmark exercise on erosion of a stratified layer by a buoyant jet in a large volume.
2. Chris Boyd, US NRC, USA
Perspectives on CFD Analysis in Nuclear Reactor Regulation.
3. Yassin Hassan, TexasA&M, USA
Multi-scale, full-field measurements and near-wall modeling of turbulent subcooled boiling flow using innovative experimental techniques.
4. Dirk Lucas, HZDR, Germany
A strategy for the qualification of multi-fluid approaches for nuclear reactor safety.
5. Mike Podowski, RPI, USA
Model verification and validation issues for multiphase flow and heat transfer simulation in reactor systems.

Poster Sessions

- At the discretion of the organizing committee, provision will be made for some papers to be presented as posters rather than orally. Full papers will nonetheless be expected; these will then be included in the official proceedings. This procedure will be followed to ensure that high quality papers, though ones perhaps not reflecting the major themes of the Workshop, are appropriately acknowledged.
- A dedicated poster session will also be arranged for participants in the OECD-PSI blind benchmark exercise to display their results. To avoid duplicity of information, **a written paper will not be required in this case.**

Use of CFD in Reactor Design

Following a recent IAEA initiative, it is apparent that the use of CFD in nuclear reactor design studies warrants increased exposure within the CFD community. Consequently, as first initiated at the previous workshop in Daejeon, Korea, some papers devoted to the use of CFD in guiding nuclear reactor design thinking will also be included in the programme.

Organizing Committee

Brian L. Smith, Paul Scherrer Institute, Switzerland, General Chair
Dominique Bestion, Commissariat à l'Energie Atomique, France, Co-Chair
Ghani Zigh, United States Nuclear Regulatory Commission, USA, Co-Chair
Horst-Michael Prasser, ETH Zurich, Switzerland, Co-Chair and Head of Local Organizing Committee
Michele Andreani, Paul Scherrer Institute, Switzerland, Synthesis of the OECD-PSI Benchmark
Martin Kissane, Secretariat, OECD Nuclear Energy Agency, France
Anthony Ulses, Observer, International Atomic Energy Agency, Austria

Scientific Committee (to be completed)

Michele Andreani, PSI, Switzerland	Kristian Angele, Vattenfall R&D, Sweden
Arnoldo Badillo, PSI, Switzerland	Emilio Baglietto, MIT, USA
Yann Bartosiewicz, UC Louvain, Belgium	Sofiane Benhamadouche, EDF, France
Ulrich Bieder, CEA, France	Dominique Bestion, CEA, France
Diana Caraghiaur, KTH, Sweden	Chris Boyd, US NRC, USA
Jose Luis Munoz Cobo, UPV, Spain	Sebastian Buchholz, GRS, Germany
Abdel Dehbi, PSI, Switzerland	Xu Cheng, KIT, Germany
Horst Glaeser, GRS, Germany	Pierre Coste, CEA, France
Yassin.Hassan, TMU, USA	Joerg Dreier, PSI, Switzerland
Wang-Kee In, KAERI, S. Korea	Estelle Graffard, AREVA, France
J.W. Kim, SNUST, S. Korea	Thomas Hoehne, HZDR, Germany
Bostjan_Koncar, JSI, Slovenia	Ralf Kapulla, PSI, Switzerland
Eckart Laurien, Stuttgart, Germany	J. Ko, AREVA, France
Dirk Lucas, HZDR, Germany	Eckhard Krepper, HZDR, Germany
Annalisa Manera, UMICH, USA	Djamel Lakehal, ASCOMP, Switzerland
Stephane Mimouni, EDF, France	Simon Lo, ANSYS, UK
Tadashi Morii, NRA, Japan	Jean Marc Martinez, CEA, France
Victor Petrov, UMICH, USA	Fabio Moretti, UniPisa, Italy
Horst-Michael Prasser, ETHZ, Switzerland	Bojan Niceno, PSI, Switzerland
Yohei Sato, PSI, Switzerland	Markus Piro, AECL, Canada
Jean-Marie Seynhaeve, UC Louvin, Belgium	Ferry Roelofs, NRG, NL
Brian L. Smith, PSI, Switzerland	Martina Scheuerer, GRS, Germany
Heikki Suikkanen, LUT, Finland	Medhat Sharabi, PSI, Switzerland
Timo Toppila, FORTUM, Finland	Chul-Hwa Song, KAERI, S. Korea
Tadashi Watanabe, JAEA, Japan	Iztoc Tiselj, JSI, Slovenia
Guan Yeoh, UNSW, Australia	Pascal Veber, ONSALA, Sweden
Jin Yan, GE, USA	George Yadigaroglu, ASCOMP, Switzerland
Han-Young Yoon, KAERI, S. Korea	

Local Organizing Committee (ETHZ, Switzerland)

Horst-Michael Prasser	Nora Kerenyi	Robert Adams
Christian Bolesch	Paolo D'Aleo	Ralph Eismann
John Kickhofel	Nathan Lafferty	Abhishek Saxena

Dates & Deadlines (Revised)

June 30, 2014	Final deadline for receipt of draft paper
July 15, 2014	Decision on acceptance; reviewers' comments
July 31, 2014	Final paper due
July 31, 2014	Deadline for early registration

Registration Procedures

A special website has been created at ETHZ. To gain access, you are invited to register online:

<http://www.lke.mavt.ethz.ch/CFD4NRS/>

There, you will see the registration fees displayed as follows:

Early registration (before July 31, 2014)

Normal: 450 CHF

Student: 320 CHF

Normal registration

Normal: 500 CHF

Student: 350 CHF

1 To register for the CFD4NRS-5 Conference:

1. Create an new ETH Conference user account
2. After creating the account you will receive a password in your email. You will need this password to login and register. Make sure the email is not sent to a junk folder.
3. Register and pay. Note the fee is reduced for registering early (before July 31, 2014).

In order to register, you will first need to create a user account by clicking on the link above. Your username will be your standard email address (e.g. brian.smith@psi.ch). You will then be sent a password in order to access your account.

Once you have a user account, you can register and pay the appropriate registration fee by clicking on the link "Register and pay", as displayed above. You can pay the appropriate registration fee via MasterCard/Visa/AmericanExpress/DinersClub.

Having completed this process, you will then be automatically registered as a participant to the CFD4NRS-5 Workshop.

Accompanying Persons

All registered participants will receive an invitation to the Workshop Banquet (see attached link), to take place during the evening of September 10, 2014 at the "Commihalle" restaurant, Stampfenbachstrasse 8, 8001 Zürich, close to the central railway station (see website for location). If you wish to bring a non-registered person to the banquet, **we will require notice in advance**. Please send an email to brian.smith@psi.ch in order to reserve a place, and communicate any culinary requirements (as on the registration website). An banquet fee of CHF 100.- will be requested at the registration desk for accompanying persons. Please keep in contact with the website <http://www.lke.mavt.ethz.ch/CFD4NRS/> during the coming weeks for updates on information.
