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**CFD2012**  
**CANMORE, AB**  
**MAY 9-11, 2012**

[cfdcanada.ca/conference](http://cfdcanada.ca/conference)

### DEADLINES:

**abstracts: Nov 30, 2011**  
**acceptances: Jan 9, 2012**  
**final papers: Mar 31, 2012**

### REGISTRATION:

**before March 31, 2012 -**  
**\$450 regular / \$200 students**

**beginning April 1, 2012 -**  
**\$500 regular / \$250 students**

### TRAVEL GRANTS:

**A number of \$500 student travel grants will be awarded; details on page 2**

**CFD2012 CHALLENGE**  
**MAY 12, 2012**

[cfdcanada.ca/challenge](http://cfdcanada.ca/challenge)

# Société canadienne de Society of Canada

## President's Message

Dear CFDSC members,

At the recent Annual General Meeting (AGM), the Society voted to keep me in this position for another year. I gladly accepted, as the Society is embarking on an exciting year preparing to celebrate its 20th anniversary at the upcoming 2012 conference. I thank the board members for the incredible support they have given the Society, to ensure its continued success. I thank the members for putting their trust in me for a second time. I understand that it serves the Society's stability, and you may count on me to continue doing all I can to serve your interests.

The benefits of, and the need for CFD have never been so widely accepted and requested. We must thank our founders for having formed this Society 20 years ago, for the very purpose of highlighting the capabilities of this revolutionary technology to the scientific community at large. Simulation-based technologies have benefited from the technology pull created by the development of CFD. Its success has been so well demonstrated that it now occupies a privileged position in applications such as the aerospace industry (which I know best), but also other fields requiring studies of fluid

mechanics phenomena: atmospheric sciences, blood flows, combustion, etc.

Today's environmental challenges provide a unique opportunity to use CFD for solving the pressing issues that affect our planet. CFD has now reached a level of maturity that allows it to benefit other disciplines. This brings additional challenges to the CFD community: how to transition from a historical legacy of intense CFD development, to one of using CFD for the advancement of other disciplines. Fundamental developments are still required, but there are additional needs, to continue to provide a technology push in interdisciplinary research and applications.

Perhaps a new generation of scientists will help make this transition successful. I am particularly delighted that there is a lot of interest from new or recent members to become active in the Society, as well as a commitment from experienced members to help guide the Society towards safe ground. For instance, there were several student candidates for the two student board positions at the recent AGM. Participation in the Society is a prerequisite for its longevity, which has seen uninterrupted annual conferences since its foundation. To cope with the challenges, the Board is currently studying several proposals to alter the way that the Society will work. There are

several committees currently in place to ensure we adapt to the changing reality. One avenue which will be proposed at our next AGM is fellowship appointments. Another is to perhaps change the way the Society operates. We welcome your feedback, and particularly your participation in these important decisions that will shape the next 20 years of our Society. I urge you to write me (or any board member) with any ideas you would like us to pursue. I also invite you all to a very important 2012 meeting in beautiful Canmore, Alberta. We have two very enthusiastic chairmen, Robert Martinuzzi of the University of Calgary and Carlos Lange of the University of Alberta, who are introducing a CFD Challenge with available experimental data. We are currently looking into the possibility of a special journal issue dedicated to the CFD Challenge. As well, the Board is considering spending some of its surplus to ensure a broad participation: the guest speakers are already confirmed, and we are looking to strengthen how we publicize the event. I hope to see you there in good form and in good numbers,

Eric Laurendeau  
President, CFDSC, 2010 - 2012

## CFDSC Annual General Meeting

The Annual General Meeting of the CFDSC will be held during CFD2012.

## CFD2012 - May 9-11, 2012 - Canmore, Alberta

You are invited to celebrate the 20<sup>th</sup> anniversary of the CFD Society of Canada in the majestic Rocky Mountains! To mark this event, our Society is preparing a very special conference. In addition to a strong scientific program, the conference will feature three keynote speakers: S. Jakirlic (TU Darmstadt), K. Nandakumar

(Louisiana U), and B. Noack (CEAT/Poitiers), and a new CFD Challenge: Simulation of Flow Around a Surface-Mounted Square-Section Cylinder of Aspect Ratio 4. A dedicated workshop following the main conference will compare the best simulation attempts of Challenge participants with high-quality, phase averaged experimental results. More details on the Challenge are at [www.cfdcanada.ca/challenge](http://www.cfdcanada.ca/challenge).

The 2012 CFDSC conference will take place at the Radisson Hotel & Conference Centre in Canmore, Alberta, May 9-11, 2012; the Challenge Workshop will take place on May 12. Ideally located with direct access to the Trans Canada Highway and within walking distance of downtown Canmore, the hotel is surrounded by spectacular mountain views. Take advantage of the regularly scheduled shuttle services to and from Calgary which stop at the Radisson. The hotel's close proximity to the many activities of the area makes it the perfect location for this conference. In your free time you can enjoy golfing, sightseeing, hiking, whitewater rafting, horseback riding, biking, fishing, shopping or just relaxing. Additional attractions such as gondola rides, natural hot pools, park museums and interpretive centres await you only fifteen minutes away in Banff. Plan to extend your stay in Canmore and explore the magnificent Canadian Rockies or investigate other parts of Alberta!

We will top off our celebration in style with a banquet at the Cornerstone Theatre & Restaurant, home of the world famous "Oh Canada Eh?" Dinner Show.

Don't miss this special meeting! See you in Canmore in May, 2012.

For updated information, please check [www.cfdcanada.ca](http://www.cfdcanada.ca).

Robert Martinuzzi (U. Calgary)  
Carlos Lange (U. Alberta)

for more information, see:

[Radisson Hotel/Conference Centre](#)  
[Canmore Tourism](#)  
[Cornerstone Theatre & Restaurant](#)

## CFD2012 Student Travel Grants

To encourage student participation at CFD2012, the CFDSC will award a number of \$500 travel grants. An application form and instructions are posted at [www.cfdcanada.ca](http://www.cfdcanada.ca). Applications are due November 30, 2011, to coincide with the abstract submission deadline. Travel grant awardees will be notified by January 9, 2012, the deadline for notification of abstract acceptance.

## Summary - CFD2011, Montréal

The 19th Annual Conference of the CFD Society of Canada was held in the beautiful city of Montréal, April 28 - 29, 2011, jointly with AERO 2011, the 58th CASI Aeronautics Conference. The conference was organized by Pierre Gauthier of Rolls-Royce Canada.

The conference featured 59 technical papers, and three keynote presentations, by Tom Scarinci, Executive Vice President of Engineering and Technology - Energy at Rolls-Royce Canada, Dr. Christian Masson, Research Chair in Aerodynamics of Wind Turbines in Nordic Environments at the École de technologie supérieure, and Dr. Roopesh Mathur, Product Manager for CFD at ANSYS Inc.

**Student Paper Competition** – Student participants were encouraged to have their papers/presentations judged and considered in the student paper competition. Judging of the papers was conducted by conference participants from industry, government and academia.

The winners of the 2011 student paper competition were:

First place (\$500 and a plaque):  
Jean-Sébastien Cagnone of McGill University, for "A Procedure for Adaptive Polynomial Refinement in the Lifting Collocation Penalty Method."

Second place (\$200 and a plaque):  
Jean-Pierre Hickey of the Royal Military College, for "Path to Turbulence in an Asymmetric Planar Wake."

**Sponsors** – The conference organizers are grateful to the following sponsors, all of whom provided financial support: MAYA Heat Transfer Technologies, Rolls-Royce Canada, Bombardier, and Pratt & Whitney Canada.

## Graduate Scholarships

The CFDSC awards at least two scholarships per year, each valued at \$2,000, to students conducting exceptional research in computational fluid dynamics. The field of study may involve the development of CFD techniques and/or the use of CFD to solve important problems.

Applicants for both must be full-time students enrolled in a Masters or PhD level program at an accredited Canadian University.

An application form and instructions are posted at [www.cfdcanada.ca](http://www.cfdcanada.ca). Applications are due March 1, 2012. Scholarship winners will be announced at the 20th Annual Conference of the CFDSC in Canmore, Alberta.

## 2011 Graduate Scholarship Awardees

Congratulations! The following two students were awarded \$2,000 scholarships at CFD2011 in Montréal:

Sébastien Leclaire of École Polytechnique de Montréal, and

Brian Maxwell of the University of Ottawa.

## Call for Nominations - Lifetime Achievement Award

The CFD Society of Canada invites nominations for the presentation of its Lifetime Achievement Award, presented to exceptional Canadian scientists recognized for seminal and longstanding work in Computational Fluid Dynamics.

This award is an exceptional one and is not offered regularly.

For information regarding eligibility criteria and nomination procedures please visit our website at [www.cfdcanada.ca](http://www.cfdcanada.ca).

## CFDSC BOARD OF DIRECTORS

President - Éric Laurendeau  
(École Polytechnique de Montréal)

Markus Bussmann (Toronto)  
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Ugo Piomelli (Queen's)  
Tony Straatman (UWO)  
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Société canadienne de



Society of Canada

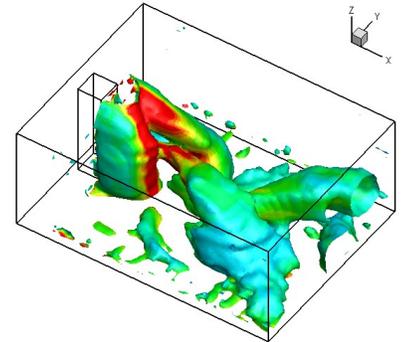
# 20<sup>th</sup> Annual Conference of the **CFD Society of Canada** Canmore, AB – May 9-11, 2012

**Co-Organizers:** Robert Martinuzzi, U. of Calgary  
Carlos Lange, U. of Alberta

**Keynote Speakers:** Suad Jakirlic, TU Darmstadt  
K. Nandakumar, Louisiana U.  
B. Noack, CEAT/Poitiers

More information at [www.cfdcanada.ca](http://www.cfdcanada.ca)

**CFD 2012 Challenge:**  
Simulation of Flow Around a  
Surface-Mounted Square-section  
Cylinder of Aspect Ratio 4  
Workshop will take place on May 12



**Special Anniversary Banquet:**  
Oh Canada Eh? Dinner Show



**Radisson Hotel Canmore**  
In the heart of the majestic Rocky  
Mountains, we celebrate our 20<sup>th</sup>  
Annual Conference in a spacious and  
comfortable hotel at specially  
discounted rates.



## CFDSC 2012 CHALLENGE

### Simulation of Flow Around a Surface-Mounted Square-section Cylinder of Aspect Ratio 4

**Purpose:** This challenge aims to motivate an open discussion on the state-of-the-art in CFD simulation and strategies for analysis of complex, separated flows at moderate Reynolds numbers. An experimental benchmark will provide a context for presenting results. This challenge will focus on identifying the strengths and the cost/benefit of the simulation/analysis approaches.

Simulations based on URANS, LES, DNS, hybrid or discontinuous Galerkin methods are welcome. Discussions addressing simulation challenges, post-processing strategies or feature extraction techniques are highly desirable.

**Presentation and Workshop:** Participants to the challenge are expected to contribute a full length paper and oral presentation during the general meeting. A special workshop is planned following the general meeting on Saturday, May 12, 2012. Participants are asked to share simulation details, challenges and/or technique advances in a 10 minute presentation followed by a question period. A brief comparative overview of submitted results will be provided by the organisers leading to an open forum discussion. Negotiations are presently being conducted for dissemination of the Challenge results in a journal special issue.

**Overview of Experimental Setup:** Experiments were conducted in an open-section (zero streamwise pressure gradient) wind tunnel. The obstacle was a square-section cylinder of side dimension  $d = 12.7\text{mm}$  and height  $h = 50.4\text{mm}$  (aspect ratio  $h/d = 4$ ). The obstacle was mounted vertically at a distance of  $4h$  from the leading edge of the plate. The unperturbed boundary layer (obstacle removed) at  $4h$  was developing turbulent with a thickness of approximately  $0.18h$ . The free stream velocity was  $U = 15\text{m/s}$ , the free stream turbulence intensity approximately 0.8% and the obstacle Reynolds number was  $Re \approx 11,000$  based on  $d$  and  $U$ . The flow is characterised by periodic shedding vortices corresponding to a Strouhal number, based on  $d$  and  $U$ , of  $St = 0.100 \pm 0.003$ .

Velocity measurements were made with high frame-rate PIV (500Hz or 1000Hz) and hot-wire anemometry. Reference pressure measurements on the side of the obstacle were used for the purposes of phase-averaging. Results are complemented by surface oil-film visualisations. Initial measurements indicated that  $St$  and the macroscopic flow features were insensitive to the Reynolds number in the range  $6,000 < Re < 50,000$ .

#### Timeline:

July 15, 2011 Base flow information will be made available through the society website (<http://www.cfdcanada.ca/challenge>) to allow initial problem set-up. The information provided will include:

- Nomenclature and geometry definition
- Unperturbed boundary layer profiles

- Time (Reynolds) averaged velocity field in the plane of symmetry, three horizontal planes parallel to plate and one plane normal to the flow

Sept. 30, 2011 Participants are asked to register their intent to participate at the challenge (<http://www.cfdcanada.ca/challenge>). This registration will assist the organising committee in coordinating and preparing the workshop. Initial participant input in the preparation of the workshop will be requested.

March 1, 2012 Phase average data in selected planes will be provided. Format and selected comparison formats and data selection will be provided.

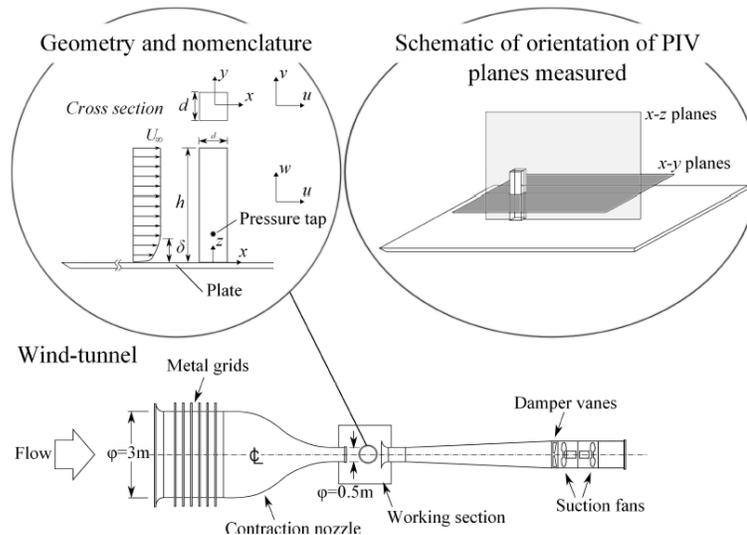
April 1, 2012 Participants will be asked to provide sample results in prescribed format to allow the organising committee to prepare a comparative overview. At this time, participant suggestions for the organisation of the workshop are strongly encouraged.

**Challenge Organising Committee:**

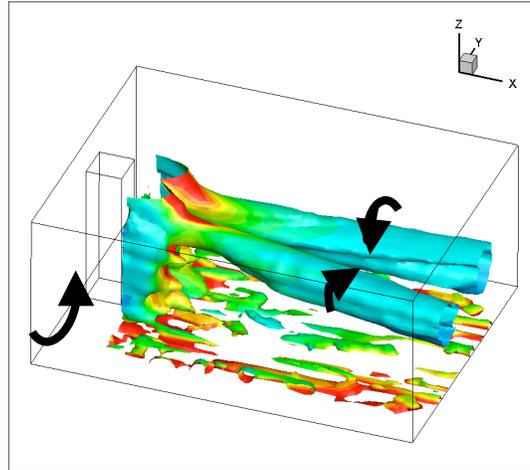
Carlos Lange ([carlos.lange@ualberta.ca](mailto:carlos.lange@ualberta.ca))

David E. Rival ([derival@ucalgary.ca](mailto:derival@ucalgary.ca))

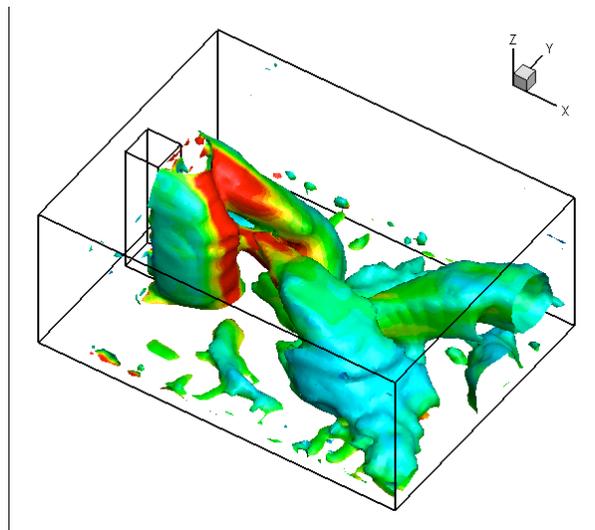
Robert J. Martinuzzi ([rmartinu@ucalgary.ca](mailto:rmartinu@ucalgary.ca))



**Figure 1:** Schematic of experimental set-up and nomenclature.



**Figure 2:** Mean vortex structure as identified using  $\lambda_2$ -criterion. Surface coloured by vorticity magnitude.



**Figure 3:** Instantaneous vortex structure as identified using  $\lambda_2$ -criterion. Surface coloured by vorticity magnitude.