



**A EUROPEAN SYNERGY FOR  
THE ASSESSMENT OF WALL TURBULENCE.**

**EC FP6 PROJECT N°: AST4-CT-2005-516008**

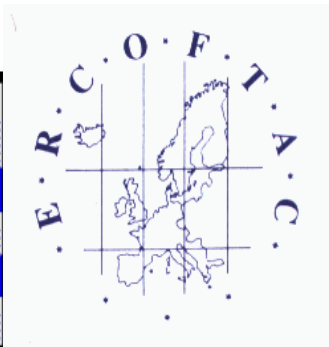
Coordinator : Pr Stanislas  
LML UMR CNRS 8107  
Bv Paul Langevin, Cité scientifique  
F 59655 Villeneuve d'Ascq Cedex

Tel: (33) 03 20 33 71 70  
Fax: (33) 03 20 33 71 69

Email: [wallturb@univ-lille1.fr](mailto:wallturb@univ-lille1.fr)  
<http://wallturb.univ-lille1.fr>

**Progress in Wall Turbulence : Understanding and modelling  
Lille (France) : April 21-23 2009**

**Sponsored by :**



Monday April the 20<sup>st</sup> 2009

18h -20h Registration

Tuesday April the 21<sup>st</sup> 2009

**7h30h-8h30 Registration**

8h30 **Welcome address : M. Stanislas**

8h40 **Lecture 1: The Law of the Wall. Indications from DNS, and Opinion. P.Spalar**

9h20 **Session 1: The WALLTURB LML Experiment**

**chairman: I. Marusic**

The WALLTURB joined experiment to assess the large scale structures in a high Reynolds number turbulent boundary layer.

J. Delville, P. Braud, S. Coudert, J.M Foucaut, C. Fourment, W.K. George, P.B.V. Johansson, J. Kostas, F. Mehdi, A. Royer, M. Stanislas, M. Tutkun

Hot wire rake calibration for the WALLTURB experiment.

M. Stanilas, J. M. Foucaut, M. Tutkun, J. Delville, S. Coudert, W.K. George

Spatial correlation from the SPIV database of the WALLTURB experiment.

J.M. Foucaut, S. Coudert, M. Stanislas, J. Delville

Correlations and POD from the HW rake database of the WALLTURB experiment.

M. Tutkun ,W. K. George, M. Stanislas, J.M. Foucaut, S. Coudert, J. Delville

10h40 Coffee break

11h10 **Session 2: Experiments in FP BL**

**chairman: M. Stanislas**

Reynolds number dependence of the near-wall amplitude modulated cycle.

I. Marusic, R. Mathis, N. Hutchins

Lagrangian and Eulerian aspects of a turbulent boundary layer flow An investigation using time-resolved tomographic PIV.

A. Schröder, R. Geisler, K. Staack, A. Henning, B. Wieneke G.E. Elsinga, F. Scarano, C. Poelma, J. Westerweel

Tomographic Particle Image Velocimetry Measurements of a High Reynolds Number Turbulent Boundary Layer.

C. H. Atkinson S. Coudert, J.M. Foucaut, M. Stanislas , J. Soria.

Study of the vortical structures in turbulent near wall flow.

S. Herpin, S. Coudert, J.M. Foucaut, J. Soria, M. Stanislas

12h30 Lunch

14h00      **Lecture 2: A Web-Services accessible turbulence database of isotropic turbulence: lessons learned** C. Meneveau

14h40      **Session 3: Experiments in APG BL**      **chairman: J. Delville**

Measurements in a boundary layer undergoing curvature, adverse pressure gradient and separation.      P. Nathan and P. E. Hancock

Experiments and Modeling of Boundary Layers Subjected to Various Pressure Gradients      H. Nagib

Experimental analysis of a turbulent boundary layer under the influence of an adverse pressure gradient.      W. Elsner, Drobniak, Drozd, Materny

Near wall measurements in a separating turbulent boundary layer with and without passive flow control      D. Lengani, D. Simoni, M. Ubaldi, P. Zunino, F. Bertini

16h00      Coffee break

16h30      **Session 4: BL structure and scaling**      **chairman: W.K. George**

On the dynamical relevance of coherent vortical structures in turbulent boundary layers.      S. Pirozzoli

Spanwise characteristics of hairpin packets in a turbulent boundary layer under a strong adverse pressure gradient      S. Rahgozar and Y. Maciel

The mesolayer, why it is important for boundary layer modeling?      W.K. George

A possible scaling of the flat plate boundary layer.      M. Stanislas, L. Perret, J.M. Foucaut

18h10      End of first day

Wednesday April the 22<sup>nd</sup> 2009

8h30      **Lecture 3: DNS and the Modeling of Multi-Point Correlations in Wall-Bounded Turbulence R. Moser**

9h10      **Session 5 : DNS and LES**

**chairman: C. Meneveau**

DNS of separated channel flows.

J.P. Laval, M. Marquillie

Estimation of turbulent convection velocities and corrections to Taylor's approximation.

J.C. del Alamo, J. Jimenez

The structure tensor of Couette Poiseuille flow.

P. Orlandi, S.Pirozzoli, F. Fabiani and M. Bernardini

A New Multi-Scale & Dynamic Method for Spatially Evolving Flows.

L. Castillo, Araya, Meneveau and Jansen

10h30      Coffee break

11h00      **Session 6 : Theory**

**chairman: J.F. Morrison**

New LES models for wall turbulence.

B. Dubrulle

Entropic-skins geometry for wall turbulence intermittency.

D. Queiros Condé

Direct simulations for wall modeling of multicomponent reacting compressible turbulent flows

O. Cabrit, F. Nicoud

A specific behaviour of adverse pressure gradient near wall flows.

M. Stanislas, I. Shah, J.P. Laval

12h20      Lunch

13h50      **Lecture 4 : Regularization modeling for LES of turbulent flow separation B. Geurts**

14h30      **Session 7: RANS modelling**

**chairman: P. Spalart**

A non-linear eddy-viscosity model for near-wall turbulence.

B. Anders Pettersson Reif, M. Mortensen

ASBM-BSL : An easy access to the structure based model technology.

B. Aupoix, S.C. Kassinos, C.A. Langer

On the role of the convective term for scaling laws and improved wall-functions for adverse pressure gradient flow.

T. Knopp

Accounting for wall effects in explicit algebraic Reynolds-stress models

A.G. Oceni, R. Manceau, T.B. Gatski

15h50      Coffee break

16h20      **Lecture 5 : Reduced-, low- and least-order models of turbulence : Insights from nonlinear dynamics, statistical physics and turbulence theories. B. Noack**

17h00      **Session 8: Dynamical systems**

**chairman: B. Noack**

"POD based ROM for prescribing turbulent near wall unsteady boundary conditions"

G. Lehnasch, J. Jouanguy, J.P Laval & J. Delville,

POD based low order dynamical system in near wall turbulence.

B. Podvin

HR SPIV for dynamical system construction  
The stagnation point Von Karman constant

J.M. Foucaut et al  
V. Dallas, J.C. Vassilicos & G.F. Hewitt

18h20      End of second day

**20h 00      Workshop dinner**

Thursday April the 23<sup>rd</sup> 2009

8h30            **Lecture 6: Theoretical prediction of turbulent skin friction on geometrically complex surfaces, P. Sagaut**

9h10            **Session 9 : LES**

**chairman: B. Geurts**

Wall modelling within the implicit LES framework in adverse pressure-gradient boundary layers.

C. Stemmer, Z.L. Chen, E. Lauer,  
S. Hickel, A. Devesa, N. A. Adams

LES of Turbulent Channel Flow with Pressure Gradient Corresponding to Turbomachinery Condition.  
LES simulation of a converging diverging channel using different models

W. Elsner, L. Kuban, A. Tyliczszak

J.P. Laval, W. Elsner, M. Marquillie

Large-scale organized motion in turbulent pipe flow

S. Große, D.J. Kuik and J.  
Westerweel

10h30            Coffee break

11h00            **Session 10: skin friction**

**chairman: H. Nagib**

Near-Wall Measurements and Wall Shear Stress

T. Gunnar Johansson

Oil film wall shear stress measurements through separation.

P. Nathan and P. E. Hancock

Measurements of near wall velocity and wall stress in a wall-bounded turbulent flow using Digital Holographic Microscopic PIV and Shear Stress Sensitive Film

O. Amili, J. Soria

Wall shear stress measurement in a TBL using the oil droplet interferometric technique

G. Pailhas, P. Barricaut, L. Perret

12h20            Lunch

13h 40            **Session 11 : Modified wall flow**

**chairman: P. Sagaut**

The scaling of turbulence structures in very-rough-wall channel flow.

D.M. Birch, J. F. Morrison

Characterising 2-phase boundary layer flow

M. Harleman, R. Delfos, J.  
Westerweel, T. van Terwisga

Direct and large eddy numerical simulations of turbulent visco-elastic drag reduction.

L. Thais, A. E. Tejada-Martinez, T. B.  
Gatski, G. Mompean, H. Naji

DNS of Supercritical Carbon Dioxide Turbulent Channel Flow.

M. Tanahashi, Y. Tominaga, M.  
Shimura, K Hashimoto and T.  
Miyouchi.

15h 00      **Session 12 : Industrial modeling**

**chairman: M. Stanislas**

RANS modeling for industrial purpose

J. Benton (Airbus UK)

Turbulence modelling applied to aerodynamic design.

Vincent Levasseur, Sylvain Joly, J.-C. Courty  
(Dassault Aviation)

15h 40      **Round Table Discussion**

16h 20      **End of Workshop**

We wish to thank the following for their contribution to the success of this conference: Laboratoire de Mécanique de Lille, Université de Lille 1, Ecole Centrale de Lille, Ecole Doctorale Européenne, Région Nord Pas de Calais, CNRS, European Office of Aerospace Research and Development, Air Force Office of Scientific Research, United States Air Force Research Laboratory ([www.london.af.mil](http://www.london.af.mil))