European Research Community on Flow, Turbulence and Combustion

SCHEDULE

ERCOFTAC COMMITTEE MEETINGS

12th October 2010, Lisbon, Portugal

Instituto Superior Técnico (IST), Av. Rovisco Pais.

Sala de Reunioes do DEM

8:30-9:00	Reception
9:00-12:00	*SPC and IPC Committee meetings to be held in parallel*
12:00-14:00	Lunch
14:00-16:45	*Managing Board meeting*
16:45-17:00	*General Assembly meeting*

Documents attached

1. Agendas for the SPC, IPC and MB-GA meetings
2. Minutes of the ERCOFTAC Committee meetings held in Delft on the 18th May 2010
3. Minutes of the ERCOFTAC MB-GA meeting held in Lausanne on the 2nd October 2009
4. PC Coordinators and their SPC, IPC, MB representatives
5. Candidate resumes and statements for the election of SPC and ERCOFTAC vice-chairs
3. Applications for SIG funding for 2011
4. ERCOFTAC Workshop and Summerschool status report
5. Applications for ERCOFTAC Workshop and Summerschool sponsorship
6. ERCOFTAC financial report

European Research Community on Flow, Turbulence and Combustion

AGENDA

SCIENTIFIC PROGRAMME COMMITTEE MEETING

12th October 2010, Lisbon, Portugal

Instituto Superior Técnico (IST), Av. Rovisco Pais.

9:00 **Scientific Committee meeting, chaired by Prof. Geurts**

1. Approval of the agenda
2. Approval of minutes from the SPC meeting held in Delft on 18.5.2010
3. Action items from the from the SPC meeting held in Delft on 18.5.2010
4. Special Interest Groups
   - i. Current status report
   - ii. SIG funding requests
5. Pilot Centres
6. Workshops and summer schools
   - i. Status of reports from previous events
   - ii. Consideration of new proposals
7. Attracting young scientists to ERCOFTAC
8. Review of the ERCOFTAC Autumn Festival and 2010 DaVinci Award
9. Election of new SPC Vice-chairman (Dr. von Terzi)
10. Status of ERCOFTAC products and services
    - i. ERCOFTAC Website
    - ii. QNET-CFD Knowledge Base
    - iii. ERCOFTAC Bulletin
    - iv. ETMM8
    - v. FTAC Journal
    - vi. ERCOFTAC Book series
    - vii. ERCOFTAC Best Practice Guidelines
    - viii. ERCOFTAC Classic Database
11. Any Other Business
12. Dates and location of the next SPC meeting

12:00 **End of meeting**

European Research Community On Flow, Turbulence And Combustion

AGENDA

INDUSTRIAL ADVISORY COMMITTEE MEETING

LISBON

Instituto Superior Técnico (IST), Lisbon, Portugal

October 12, 2010

9:00 pm **IPC Meeting** (Chaired by Prof. René Oliemans)

Coffee break (around 10.30)

1. Minutes of IPC meeting held in Delft on May 18, 2010

2. QNET-CFD Knowledge Base (Prof. Rodi)
- Present status
- Launch experience
- Experience by users

3. Industrial strategy for ERCOFTAC (Dr. Seoud)
- Status of 2010 events, including feedback participants
- Status of 2011 events
- Prospects for new industrial members
- Status potential new Pilot Centres outside Europe

4. Best Practice Guidelines (BPG)
- BPG on CFD of Dispersed Multi-Phase Flow (Prof. Oliemans)
- Second edition of industrial CFD BPG (Prof. Hutton)
- Status BPG on Combustion (Prof. Tomboulides)

5. Chair and membership of IPC
- Role and operation
- Chair and Deputy Chair Person

6. Any Other Business

7. Date and location next IPC meeting

(Lunch break at the end of the meeting, approx. 12.00)

European Research Community on Flow, Turbulence and Combustion

AGENDA

MANAGING BOARD – GENERAL ASSEMBLY MEETINGS

12th October 2010, Lisbon, Portugal
Instituto Superior Técnico (IST), Av. Rovisco Pais.

14:00 Managing Board meeting, chaired by Prof. Hutton

1. Approval of the agenda
2. Approval of minutes of the MB-GA meeting held in Lausanne on 2.10.2009
3. Approval of minutes of the EC meeting held in Delft on 18.5.2010
4. Action items from the EC meeting held in Delft on 18.5.2010
5. Election of new ERCOFTAC Chairs and Managing Board members:
   - ERCOFTAC Chairman
   - ERCOFTAC First Deputy Chairman (Prof. Tomboulides)
   - IPC Chairman (Dr. Geuzaine)
   - IPC Deputy Chairman
   - SPC Deputy Chairman (Dr. von Terzi)
6. Financial report and 2010-11 budget
7. Report from Administration and Development Office
8. Report from Coordination Centre
9. Report from Scientific Programme Committee
10. Report from Industrial Programme Committee
11. The ERCOFTAC Knowledge Network
    - Programme of Events 2010 and 2011 (IEO)
    - QNET Knowledge Base Wiki
    - Best Practice Guidelines
12. Any Other Business
13. Dates and location of the next EC and MB-GA meetings

16:45 End of meeting

16:45 General Assembly meeting, chaired by Prof. Hutton

1. Approval of the agenda
2. Election of new ERCOFTAC Chairs and Managing Board members
3. Approval of the 2009 accounts and the 2010-11 budget

17:00 End of Meeting

European Research Community On Flow, Turbulence and Combustion

SCIENTIFIC COMMITTEE MEETING

18th May 2010, Delft, The Netherlands

ATTENDANCE

Anderson, H.
Barton, I.
Borhani, N.
Cambon, C.
Choi, K-S.
Da Silva, C.
Delil, A.
Geurts, B.J.
Hanifi, A.
Hutton, T.
Issa, R.
Leschziner, M.
Oliemans, R.
Redondo, J.
Reichl, C.
Rodi, W.
Tomboulides, A.
Von Terzi, D.

APPOLOGIES

Bodnar, T.
Braza, M.
Comte, P.
Dick, E.
Hamalainen, J.
Jakirlic, S.
Sommerfeld, M.
Violeau, D.

SUMMARY OF ITEMS ARISING FROM THE MEETING

- *Prof. Geurts will contact SIG and PC Coordinators to ask them for their 2010 DaVinci Award nominations and inform them of the procedures and deadlines.*
- *Dr. Borhani will write to PC Coordinators to remind them to nominate research representatives to sit on the SPC and Managing Board.*
- *Prof. Geurts will write to SPC members to inform them about the possibility of securing event funding through the EC-AERO project.*

MINUTES

The meeting was opened by the SPC Chairman, Prof. Geurts, at 9:00.

1. Approval of the agenda

The agenda was approved.

2. Approval of minutes of the SPC meetings held in Lausanne on 2.10.2009

The minutes were approved.

3. Action items from the SPC meetings held in Lausanne on 2.10.2009

The action items were reviewed.

4. Special Interest Groups

i. Current status report

Prof. Redondo stated his wish to use the ERCOFTAC logo for SIG and PC related events as a means of encouraging funding by local bodies. He noted that in these circumstances the logo should be approved whilst the event was still in it early planning stages, not when a formal application for ERCOFTAC funding was made later. Prof. Geurts agreed that this was useful for event organisers. Prof. Leschziner reminded the SPC that a fast-track logo approval process, involving communication of the details of the proposed event to the SPC Chairman, was already in place.

Prof. Cambon then asked about the possibility of using SIG funding for organising SIG related events. Dr. Hanifi also requested clarification on the use of SIG funding. Prof. Leschziner commented that SIG funding should be used to enhance and stimulate the operation of a SIG in a manner seen suitable by its Coordinator. However, he added that the money should not be used to fund invited lecturers for events.

ii. SIG funding requests for 2011

Based on their submitted proposals, the SPC voted to recommend to the Executive Committee that the following SIGs should be funded up to 3000 Euros for 2011:

SIG 12 *Dispersed turbulent two-phase flows*
SIG 20 *Drag reduction and flow control*
SIG 43 *Fibre suspension flows*

5. Pilot Centres

Dr. Borhani said that he will be writing to PC Coordinators to remind them to nominate research representatives to sit on the SPC and Managing Board.

6. EC-AERO support for ERCOFTAC workshops and schools

After discussions, Prof. Geurts urged the organisers of future ERCOFTAC Workshops and Summer Schools to seek funding through the EC-AERO project by involving ECOMMAS and/or EUROMECH. The SPC asked for clarification on the regulations on how these funds can be attained.

** Prof. Geurts will write to SPC members to inform them about the possibility of securing event funding through the EC-AERO project.*

7. Workshops and summer schools

i. Status of reports from previous events

Dr. Borhani reported that the ADO and the terms of the event funding agreement require that all event reports should be submitted within 6 months of its closing date. Funding approved for events that do not satisfy this requirement will be cancelled.

ii. Consideration of new proposals

After discussions, the SPC voted to recommend the following actions to the Executive Committee regarding sponsorship of future events:

W2010-08 *'Mixing and Dispersion in Flows Dominated by Rotation and Buoyancy'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-09 *'Global instabilities of open flows'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-10 *'Radiation of high temperature gases in atmospheric re-entry'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-11 *'6th Workshop on synthetic turbulence models'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-12 *'5th Workshop on research in turbulence and transition'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-13 *'Instabilities turbulence and interactions in rotating shear flows'*
Application to be reviewed by Prof. Geurts at a later date.

W2011-01 *'Cardiovascular fluid dynamics'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2011-02 *'3rd Workshop on Fibre suspension flows'*
Application for use of the ERCOFTAC logo was approved.

W2011-03 *'Workshop on measurement and computation turbulent spray combustion'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2011-04 *'Highly resolved diagnostics for turbulent combustion'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

S2010-05 *'Fundamentals of microscale heat transfer'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 3000 Euros was awarded.

8. Status of ETMM8

Prof .Leschziner reported that 155 papers will be presented in 6 plenary sessions, 24 normal sessions, and 2 poster sessions. There will be around 1000 pages of proceedings published in 3 volumes and a CD. He added that the event had attracted 25 sponsors for around 50k Euros, including the French Air Force who offered to pay for the printing of the proceedings.

9. ERCOFTAC 2010 DaVinci Award

Prof. Geurts will be contacting SIG and PC Coordinators to ask them for their 2010 DaVinci Award nominations and inform them of the procedures and deadlines. He added that he will also finalise the jury composition. Prof. Leschziner added that the jury composition should be spread evenly across Europe.

10. The future of ERCOFTAC

Prof. Geurts commented on the uneven age distribution and levels of professional activity amongst the Executive Committee. Prof. Hutton responded by saying the main aim of the Horizon 10 Group had been to seek ways of attracting younger talent to ERCOFTAC, but it had failed to progress. Noting that ERCOFTAC appeared to be a centralised organisation, Prof. Geurts expressed his wish that it should distribute decisions throughout the community since members felt excluded. He added that a website was irrelevant if the ERCOFTAC community was not active or motivated. Furthermore, he expressed his view that ERCOFTAC was not a dynamic organisation and had no mission statement or brand. Prof. Geurts also stated his wish that ERCOFTAC should regain its academic focus, which in turn would make it more attractive to industry. Prof. Hutton agreed by saying that the next ERCOFTAC Chairman must be an academic. Prof. Geurts then stated that inactive SIGs of importance to ERCOFTAC should be revitalised by identifying new coordinators, and that redundant SIGs should be closed down. Prof. Leschziner commented that attempts had already been made to achieve this but with limited success.

11. Status of ERCOFTAC products and services

Not discussed.

12. Any Other Business

i. Young ERCOFTAC Summer School

Dr. von Terzi reported that there will be no Young ERCOFTAC Summer School in 2010. Dr. Hanifi suggested that this event needed greater funding than the standard 3000 Euros available for Summer Schools. Prof. Leschziner responded that this 'super summer school' already received preferential funding from the ERCOFTAC Chairman's budget. Furthermore, he added that even though this is a high profile event that attracts young researchers to ERCOFTAC, it should be reviewed by the SPC in a similar manner to other Workshop and Summer School applications.

ii. Pan-European laboratory of non-homogenous turbulence

Prof. Redondo reported that the 'Pan-European laboratory of non-homogenous turbulence' had secured 150-200k Euros of funding.

13. Dates and location of the next SPC Committee Meeting

The next SPC Committee Meeting will be held in Lisbon on the 12th October 2010.

The meeting was closed by the SPC Chairman, Prof. Geurts, at 12:30.

Navid Borhani
Lausanne, 2010.

MINUTES

INDUSTRIAL PROGRAMME COMMITTEE (IPC)

18th May 2010
Committee room 4, Aula Congress Centre, TU-Delft

Attendance

Name	**Organisation**
Dr. Philippe Geuzaine	**CENAERO**
Prof. Charles Hirsch	**Numeca International**
Prof. Anthony Hutton	**Airbus UK**
Prof. Rene Oliemans	**Multiphase Flow B.V.**
Dr. Richard Seoud	**ERCOFTAC**
Prof. Wolfgang Rodi	**KIT**

1. Apologies for absence
Apologies were received from the IPC Chair, Dr. C. Lea, and SIG leader, Microfluidics and Microheat, Prof. S. Tardu.

2. Approval of the agenda
The agenda was approved as listed.

3. Minutes of IPC meeting held in Lausanne on 2nd October 2009

Item 4 ERCOFTAC Industrial Strategy, 4.ii
Regarding the actions listed for Dr. R. Seoud under 4.ii of the Lausanne minutes:-
Plans for events in 2010, are in place and were approved by the IPC in December 2009.
Also, plans for events in 2011 are taking shape, please see section 4 of the new minutes, below.
Holding the Hybrid RANS-LES course in the USA, again please see section 4.v of the new minutes, below.

There is still an outstanding action for Prof. C. Hirsch's offer to introduce VKI director to Dr. R. Seoud for assistance in advertising ERCOFTAC's events.

Item 5 QNET-CFD Wiki
Prof. W. Rodi
It was agreed in the Delft meeting that Prof. W. Rodi will coordinate with Dr. R. Seoud in meeting this action on advertising the Knowledge Base in "Flow, Turbulence and Combustion'.

Action for Prof. A. Hutton:
Dr. R. Seoud has contacted the CFD-online webmaster who was unhappy that we are charging for this service. The explanation on the costs incurred in raising the wiki to the standard that it has now did not help in convincing the webmaster. In the Delft meeting Dr. R. Seoud agreed to

contact the webmaster and explain the fact that the silver standard is open to all and includes tremendous amount of cases.

Item 6: *Action on he BPG marketing plan is still outstanding.*

4. ERCOFTAC industrial strategy (Dr. R. Seoud)

i. Status of industry events planned for 2010 (Dr. R. Seoud)
Dr. R. Seoud expressed that there will be six events in 2010. A second announcement has been made, and flyers and emails have been sent to prospective delegates. Overall, there are currently three completed programmes, a fourth which is a collaboration with SIAMUF would be completed in the next two weeks, as promised by SIAMUF. The collaboration with SIAMUF is assured to deliver some 40 delegates. The two events on "Uncertainty management and quantification in industrial analysis and design" and on "Flow control" rely on Profs. Hirsch and Hutton, respectively, to complete in time for properly advertising before the summer holidays.

Action: *Prof. Hutton will call key contacts for his event this week (week commencing 24th May 2010). Also, Prof. C. Hirsch is expected to complete this week.*

ii. Prospects for new industrial members in 2010 (Dr. R. Seoud)
We have potentially ESA (European Space Agency) and Novatem as possible candidates. McLaren F1 is a probable candidate as well.

iii. Financial forecast for 2010 (Dr. R. Seoud)
Status Quo
Apparently, and based on data provided by Prof. C. Hirsch ADO, rather the sole information available to Dr. R. Seoud, if we combine (to include two to three months /year from E-CAERO) all income and expenditures, then we are doing OK. All committee members were pleased with the situation and Prof. A. Hutton expressed that things are working.
Action: *Prof. C. Hirsch to supply the financial data from ADO to be incorporated in the financial valculations of the events.*

Relationship between revenues and costs
Action: Dr. R. Seoud to send an update of the financial status to the committee members.

Honorarium
It was decided that in the event budget estimates the honorarium per speaker is to be fixed at 300 Euro / lecturing hour.

iv. Brief feedback from delegates at industry events in Autumn 2009(Dr. R. Seoud)
Hybrid RANS-LES, FOI, Nov. 2009
The data are with Dr. C. Mockett, who informed Dr. R. Seoud that the feedback was pretty positive.

v. Present and review proposals for industry events for 2011(Dr R. Seoud)
Dr. R. Seoud stated that a global email was sent to all SIG leaders, inviting them to participate in the 2011 programme, with cc to the Executive Committee. This was followed up by telephone

and emails. The outcome was that only a few of the SIG leaders wanted to participate. The following suggestions for event topics were made:

Erik Dick - Transition modelling for internal flows (Turbomachinary Applications)
Marianna Braza (Swirling Flows) – Preparing a response.
Kyriakos.C. Giannakoglou (Design Optimisation)– Did not want to conduct a course in 2011.
Pierre Comte (Compressible turbulence) – Would be delighted but needs more time.
Ananias Tomboulides (Reactive Flows)- Flame stabilization in industrial burners.

The committee debated the available topics and expressed that three can go ahead, with the two exceptions being the topics of Marianna Braza and Pierre Comte. Therefore, we have three new topics in 2011, which are as follows:-

Prof. E. Dick (Transition modeling) – On the basis of these minutes, Dr. R. Seoud had already reported to Prof. E. Dick, who was very pleased and ready to work with us.

Prof. A. Tomboulides (Reactive Flows) – Title: Flame stabilization in industrial burners.

Prof. K. Giannakoglou (Design Optimisation) – Here, even though Prof. Giannakoglou did not want to participate in 2011, the committee felt that this is a good topic. In particular, Prof. C. Hirsch asserted that Dr. R. Seoud should contact Dr. Werner Haase and invite him to participate as a scientific coordinator on this topic, as his expertise in this field is well known and much valued.
Finally, the committee would like to see the titles of all new events.
Action: *Dr. R. Seoud to collate titles, and to contact Dr. W. Haase by email, with cc to Prof. C. Hirsch.*

Last but not least the committee is considering taking the Hybrid RANS-LES course to the USA. Here, Prof. W. Rodi would initiate the process by sending the current Hybrid RANS-LES flyer to Prof. P. Spalart. Also, Dr. R. Seoud will be investigating the possibility of holding the course at GE, Cincinnati, Ohio, as we have now held the course twice at GE, Munich.
Action: *Dr. R. Seoud to send flyer to Prof. W. Rodi*

vi. IEO support assistant (Prof. Hutton)
Prof. Hutton expressed his apologies regarding the short notice to leave ERCOFTAC, by Miss S Hutton. Dr. R. Seoud can hire support where deemed fit for purpose in the execution of his marketing campaign.

5. QNET-CFD Wiki (Prof. W. Rodi)
i. Present status
Cases that have been already added:
2D periodic hill flow
Buoyant far field plume

To be added shortly (ready, but has to be converted to Latex):
Near fields of Buoyant Plume

Planned/promised test cases:

Application Challenge 4: Four stage low speed research compressor (TU Dresden - first draft already prepared)

3 UFR's on particle laden flow (from Martin Sommerfeld)
AC/UFR NACA0021 airfoil flow (from M. Strelets together with Ch. Mockett)
UFR Car mirror flow (from Ch.. Mockett)
UFR 3D Diffusor (from Jakirlic/ von Terzi)
UFR Flow past finite-height cylinder (Rodi / Palau-Salvador)
AC/UFR Combustion case on non-premixed flames (Drobniak - Poland)
AC/UFR Combustion case on turbulent pre-mixed flame (Dreizler - Tu Darmstadt)

ii. Future plans, including marketing
Action: *Prof. W. Rodi to coordinate with Dr. R. Seoud on advertising in Springer*.

6. Best Practice Guidelines
i. Dispersed Multi-Phase Flow BPG (Prof. Oliemans)
This book has sold 98 copies since start of advertising.
The aim now is to offer this book with the first edition single phase book, free to new members.

Prof. W. Rodi requested a copy of the BPG to assist his lecture on the course Best Practice for Engineering CFD, in September 2010, at EDF, Paris, France.
Action: *Dr. R. Seoud*

ii. Industrial CFD BPG, 2nd edition (Prof. Hutton)
Action: *Prof. A. Hutton to get the information from Dr. C. Lea.*

iii. Other BPG: Combustion, Heat transfer
Prof. A Tomboulides has informed Dr. R. Seoud, that a core committee is being formed, and their objective is to identify the necessary content to create a 'cook book'. Regarding costs and budgets, Prof. R. Oliemans has passed all the necessary information to Prof. A. Tomboulides.

7. Next Chair of IPC
This was not discussed in detail here, but during the EC meeting.
Action: *Dr. Lea and prof. Oliemans to identify and approach possible candidates for chairman and deputy chairman and propose these for approval to the EC. Proposals for candidates to be send early September in invitation for Autumn meeting in Lisbon.*

8. Autumn Festival and IPC meeting
The next IPC meeting will convene in Lisbon, Portugal, 12th October 2010.

9. Any Other Business
None

12:00 End of meeting

Prof. R. Oliemans – Deputy Chairman IPC
Dr. R. Seoud – Industry Engagement Officer

European Research Community On Flow, Turbulence and Combustion

EXECUTIVE COMMITTEE MEETING

18th May 2010, Delft, The Netherlands

ATTENDANCE

Borhani, N.
Duursma, R.
Geurts, B.J.
Hirsch, C.
Hutton, T.
Leschziner, M.
Oliemans, R.
Ooms, G.
Redondo, J.*
Rodi, W.
Seoud, R.
Tomboulides, A.*

** not Executive Committee members*

APPOLOGIES

Lea, C.
Hunt, J.

SUMMARY OF ITEMS ARISING FROM THE MEETING

- *The Executive Committee voted that the SPC will comprise the research representatives of the PCs and the SIG coordinators, whilst the IPC will comprise the industrial representatives of the PCs.*
- *Dr. Borhani will write to PC Coordinators to remind them to nominate research and industrial representatives to sit on the SPC, IPC and Managing Board.*
- *The Executive Committee approved ERCOFTAC's 2009 accounts.*
- *The Executive Committee approved an increase in the ADO annual budget to 37k Euros. However, future request for budget changes should be given 6 months in advance to the Executive Committee for review.*
- *The Executive Committee voted that a sum of 500 Euros may be paid to acquire other databases of interest for inclusion in the Knowledge Base.*
- *The Executive Committee will draw up a list of suitable candidates for ERCOFTAC Deputy Chairman, IPC Chairman, IPC Deputy Chairman, and SPC Deputy Chairman for voting on at the 2010 MB-GA meeting.*
- *Prof. Hirsch will contact the Polish PC to invite them to host the 2011 ERCOFTAC Spring Festival in Poland.*

MINUTES

The meeting was opened by the ERCOFTAC Chairman, Prof. Hutton, at 12:30.

1. Approval of the agenda

The agenda was approved.

2. Approval of minutes of the MB-GA meetings held in Lausanne on 2.10.2009 and the EC meeting held in Budapest on 5.5.2009

The minutes were approved.

3. Action items from the MB-GA meetings held in Lausanne on 2.10.2009 and the EC meeting held in Budapest on 5.5.2009

The action items were reviewed.

4. Election of new Managing Board members

After discussions:

** The Executive Committee voted that the SPC will comprise the research representatives of the PCs and the SIG coordinators, whilst the IPC will comprise the industrial representatives of the PCs.*

** Dr. Borhani will write to PC Coordinators to remind them to nominate research and industrial representatives to sit on the SPC, IPC and Managing Board.*

5. Financial Report and Approval of the 2009 accounts

Prof. Hirsch presented details of the 2009 accounts. These indicated total assets of 350k Euros, total revenues of 190k Euros, total expenses of 226k Euros, and a net operating loss of 36k Euros. Profs. Duursma and Ooms noted that ERCOFTAC assets were continuing to decline at a high rate and asked if this was in line with ERCOFTAC's industrial business plan and if the Executive Committee was satisfied with the situation. Prof. Hirsch stated that costs to date were less than anticipated by the business plan. Prof. Hutton responded that the money was being invested in developing ERCOFTAC. Furthermore, he reported that prospective new industrial members had indicated that they were not willing to join an organisation that sat on 400k Euros of assets in preference to investing membership fees to develop itself. Prof. Hutton also suggested that future accounts should be formatted to highlight the success of investments made under the business plan.

** The Executive Committee approved ERCOFTAC's 2009 accounts.*

6. Report from the Administration and Development Office

Prof. Hirsch reported that

- Ms. Emilie Jean had taken over as the new ADO secretary in Brussels.
- The ADO will be moving to the following address:

  ERCOFTAC ADO
  187-189 Chaussée de la Hulpe
  B-1170 Brussels
  Belgium

- Prof. Hirsch reported that over the last two years the ADO secretarial work load had greatly increased above the original one day per week time allocation. This was due to additional responsibilities under the business plan. Therefore, he requested an increase in the ADO budget to 37k Euros per year from January 2010 to partially cover this.

  ** The Executive Committee approved an increase in the ADO annual budget to 37k Euros. However, future request for budget changes should be given 6 months in advance to the Executive Committee for review.*

7. Report from the Coordination Centre

The Executive Committee expressed its wish for a list of up coming ERCOFTAC events and news, such as letters from the ERCOFTAC committee chairmen and IEO, to be included in the Bulletin. Dr. Borhani said a list of SPC approved workshops and summer schools will be provided in future issues of the bulletin. However, he added that the Coordination Centre was not responsible for generating or soliciting content for the Bulletin. Furthermore, additional content should be submitted in an acceptable format by the responsible parties within the advertised deadlines. Prof. Leschziner commented that the Editorial Board of the Bulletin should review and refresh the nature of its contents to reflect the current evolution of ERCOFTAC. Prof. Geurts said that he will investigate this possibility.

8. Report from the Scientific Programme Committee

i. SIG funding requests

Based on the recommendation of the SPC, the Executive Committee voted to fund the following SIGs for up to 3000 Euros during 2011:

SIG 12 *Dispersed turbulent two-phase flows*
SIG 20 *Drag reduction and flow control*
SIG 43 *Fibre suspension flows*

ii. Workshop and summer school funding requests

Based on the recommendation of the SPC, the Executive Committee approved the following actions regarding sponsorship of future events.

W2010-08 *'Mixing and Dispersion in Flows Dominated by Rotation and Buoyancy'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-09 *'Global instabilities of open flows'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-10 *'Radiation of high temperature gases in atmospheric re-entry'*
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W2010-13 *'Instabilities turbulence and interactions in rotating shear flows'*
Application to be reviewed by Prof. Geurts at a later date.

W2011-01 *'Cardiovascular fluid dynamics'*
Application for use of the ERCOFTAC logo was approved.
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W2011-02 *'3rd Workshop on Fibre suspension flows'*
Application for use of the ERCOFTAC logo was approved.

W2011-03 *'Workshop on measurement and computation turbulent spray combustion'*
Application for use of the ERCOFTAC logo was approved.
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W2011-04 *'Highly resolved diagnostics for turbulent combustion'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

S2010-05 *'Fundamentals of microscale heat transfer'*
Application for use of the ERCOFTAC logo was approved.
A scholarship of 3000 Euros was awarded.

After further discussions, the Executive Committee urged Prof. Geurts to also contact the organisers of these events to identify which could be funded through the EC-AERO project by involving ECOMMAS and/or EUROMECH.

9. Report from the Industrial Programme Committee

Prof. Oliemans reported that the implementation of the business plan was progressing well and that the IEO organised seminars were a success. He added that the Knowledge Base was online and that Prof. Rodi was soliciting for new high quality databases to be included. However, funds were necessary to acquire these new databases.

** The Executive Committee voted that a sum of 500 Euros may be paid to acquire other databases of interest for inclusion in the Knowledge Base.*

Prof. Oliemans also reported that he had received interest from Brazilian and Japanese colleagues for setting up local Pilot Centres.

10. Evolution of ERCOFTAC and its future operation

i. Succession of Chairs and Deputy Chairs

Prof. Hutton note that the terms of many of the ERCOFTAC Committee Chairs and Deputy Chairs would be coming to an end at the end of 2010. Therefore, it was decided that:

** The Executive Committee will draw up a list of suitable candidates for ERCOFTAC Deputy Chairman, IPC Chairman, IPC Deputy Chairman, and SPC Deputy Chairman for voting on at the 2010 MB-GA meeting.*

ii. Engaging the next generation: Horizon 10 and other initiatives

Prof. Hutton urged that the Horizon 10 group should be reinvigorated. Prof. Leschziner suggested that Dr. von Terzi should be approached to take over Chairmanship of Horizon 10. Prof. Geurts state that he would review the situation, but preferred to be involved in the coordination of Horizon 10, possibly in partnership with Dr. von Terzi.

iii. Global incubation of ERCOFTAC

Dr. Seoud reported that Texas A&M had now become members on the strength of ERCOFTAC's BPGs. He added that they had also enquired about hosting future ERCOFTAC Seminars in the USA.

11. Executive operational decisions

None.

12. Any Other Business

i. ETMM8

Prof .Leschziner reported that 155 papers will be presented in 6 plenary sessions, 24 normal sessions, and 2 poster sessions. There will be around 1000 pages of proceedings published in 3 volumes and a CD. He added

that the event had attracted 25 sponsors for around 50k Euros, including the French Air Force who offered to pay for the printing of the proceedings.

13. Dates and location of the next ERCOFTAC Committee Meetings

The next ERCOFTAC Autumn Festival and Committee Meetings will be held in Lisbon on the 11-12th October 2010, respectively. After discussions, the Executive Committee decided that:

** Prof. Hirsch will contact the Polish PC to invite them to host the 2011 ERCOFTAC Spring Festival in Poland.*

The meeting was closed by the ERCOFTAC Chairman, Prof. Hutton, at 16:30.

Navid Borhani
Lausanne, 2010.

European Research Community On Flow, Turbulence and Combustion

MANAGING BOARD MEETING

2nd October 2009, Lausanne, Switzerland

ATTENDANCE

Borhani, N.
Braza, M.
Cambon, C.
da Silva, C.
Geurts, B.J.
Gromke, C.
Hämäläinen, J.
Hirsch, C.
Hutton, T.
Jakirlic, S.
Lea, C.
Leschziner, M.
Nowakowski, A.
Oliemans, R.
Ooms, G.
Quack, M.
Redondo, J.
Reichl, C.
Rodi, W.
Seoud, R.
Sommerfeld, M.
Tardu, S.
Tomboulides, A.
Van Steenhoven, A.
Vlachos, N.
Von Terzi, D.

APPOLOGIES

Castilla, R.
Gauger, N.
Geuzaine, P.
Hanifi, A.
Hunt, J.
Koumoutsakos, P.
Thome, J.
Violeau, D.
Von Rohr, P.
Wallin, S.

SUMMARY OF ITEMS ARISING FROM THE MEETING

- *The Managing board voted that non-European organisations could join ERCOFTAC directly rather than through a national Pilot Centre.*
- *The rights of such non-European members to sit on the Managing Board will be reviewed by the Executive Committee and presented at the Spring ERCOFTAC meeting in Delft.*
- *The ERCOFTAC by-laws need to be modified to allow non-European members.*
- *The Managing Board approved the hiring of Ms. Hutton, on a one week per month basis at a rate of 500 Euros per month, to assist Dr. Seoud in the marketing and research of events and to support the QNET-CFD Knowledge Base.*
- *Dr. Borhani will write to all of the Pilot Centre Coordinators asking for one research and one industrial representative for the year 2011. These will then be approved by the Managing Board and General Assembly at the Autumn ERCOFTAC committee meetings in 2010.*
- *The SPC will comprise the research and industrial representatives of each Pilot Centre, and the SIG Coordinators.*
- *The nature of the IPC will be considered by the Executive Committee and discussed during the Spring ERCOFTAC meeting in Delft.*
- *The Managing Board voted to appoint Dr. Lea as the ERCOFTAC Webmaster at a rate of 4000 Euros per year.*
- *The Managing Board voted to appoint Prof. Rodi to the new position of Knowledge Base Editor on the Executive Committee.*
- *The Managing Board voted that the table of contents of all issues and the editorials of themed issues be made freely available on the ERCOFTAC website to all. However, the full Bulletin will only be made available online to members.*

MINUTES

The meeting was opened by the ERCOFTAC Chairman, Prof. Hutton, at 14:00.

1. Approval of the agenda

The agenda was approved.

2. Approval of minutes from the Executive Committee meetings held in Budapest on the 5.5.2009

The minutes were approved.

3. Action items from the Committee meetings held in Budapest on the 5.5.2009

These will be addressed below.

4. The evolution of ERCOFTAC and its future operation

i. Membership by non-European Organisations

Prof. Hutton stated that ERCOFTAC now invites organisations outside of Europe to become members. He reported that Boeing had become the first non-European member of ERCOFTAC, having subscribed to a multi-site membership. Prof. Hutton also urged members to contact their non-European colleagues to promote more members. He added that the Executive Committee suggests such organisations may join directly rather than going through a Pilot Centre. They may then germinate their own national Pilot Centres at a later date if they wished.

** The Managing board voted that non-European organisations could join ERCOFTAC directly rather than through a national Pilot Centre.*

** The rights of such non-European members to sit on the Managing Board will be reviewed by the Executive Committee and presented at the Spring ERCOFTAC meeting in Delft.*

** The ERCOFTAC by-laws need to be modified to allow non-European members.*

ii. EC-AERO and its implications for ERCOFTAC

Prof. Hirsch gave a summary of ERCOFTAC's involvement in the European Commissions' EC-AERO proposal to coordinate the dissemination of scientific information in the field of aeronautics. The aim of this proposal is to minimise the overlap between such courses and activities. Partners in the EC-AERO proposal include: ECCOMASS, ERCOFTAC, CEAS, EUCASS, EUROMECH and EUROTURBO. Of the present 750k Euros EC-AERO budget, around 80k Euros has been assigned to ERCOFTAC for manpower costs and the support of ERCOFTAC activities. EC-AERO is currently promoting joint activities by these organisations to show if they can work together, these activities include: joint ERCOFTAC-EUROMECH summer schools, and joint ERCOFTAC-CEAS industrial days. He reported that there was a kick-off meeting held in Barcelona on the 28th September 2009 which Dr. Seoud attended. Dr. Seoud then reported a number of proposals resulting from this meeting: i) the creation of an EC-AERO website to advertise the activities of all of the consortium members, ii) a common registration form and payment system for all of the activities related to the consortium members, iii) the harmonisation of activities such as summer schools and conferences, iv) collaboration in the creation of future Best Practice Guidelines on a number of subjects, and v) the creation of databases for the validation of numeric codes. Furthermore, as part of these proposals, Dr. Seoud will be submitting a report in 11months time to EC-AERO on how the consortium members are presently advertising and disseminating information from their events. After discussions, the Managing Board urged that care should be taken in not undermining the present operations of ERCOFTAC through this consortium.

5. Election of new Managing Board members

The Managing Board unanimously elected the following:

- Prof. Hirsch as the ERCOFTAC 2nd Deputy Chairman.
- Prof. Geurts as the ERCOFTAC SPC Chairman: approved unanimously.
- Prof. Leschziner as the ERCOFTAC SPC Deputy Chairman for one more year, until another candidate can be identified for the position with the intention that they should step up to SPC Chairmanship at a future date.

5. Financial report

Prof. Hirsch reported that to date in 2009 there was an income of around 113k Euros from membership fees, 6k Euros from BPGs, and 9k Euros from ETMM8. Total expenses to date are around 90k Euros, this includes a cost of 8k Euros for the upgrade of the website. He added ERCOFTAC has total current assets of around 410k Euros of which 370k Euros is cash and 40k Euros is accounts receivable.

6. Report from the Administration and Development Office

Prof. Hirsch reported that the ADO was keeping track of the late payment of membership fees.

7. Report from the Coordination Centre

Dr. Borhani reported that the Coordination Centre was not seeking an increase in funding for 2010.

8. Report from the Scientific Programme Committee

i. SIG funding requests

Based on the recommendation of the SPC, the Managing Board voted to fund a further four SIGs for up to 3000 Euros during 2010. These SIGs were:

SIG 20 *Drag reduction and flow control*
SIG 28 *Reactive flows*
SIG 35 *Multipoint turbulence structure and modelling*
SIG 42 *Synthetic models in turbulence*

Requests for reimbursements by these funded SIGs should be made to the ERCOFTAC ADO in Brussels. For invoiced items, the ADO should be provided with receipts, a short justification, and bank details. All reimbursement requests will be audited by the ADO before payment.

ii. Workshop and summer school funding requests

Based on the recommendation of the SPC, the Managing Board approved the following actions regarding sponsorship of future events:

W2009-11 '*Research in turbulence and transition'*, Lisbon, Portugal, 16.10.2009.
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2009-12 *'Turbulent flows – Velocity gradients and increments'*, Ecully, France, 4-5.12.2009.
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-01 '*Workshop on fibre suspension flows'*, Stockholm, Sweden, 9-10.2.2010.
Application for use of the ERCOFTAC logo was approved.

W2010-02 *'MUSAF colloquium'*, Toulouse, France, 27-29.9.2010.
Application for use of the ERCOFTAC logo was approved.

W2010-03 '*European drag reduction and flow control meeting'*, Kiev, Ukraine, 6-9.9.2010.
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-04 *'Advances and applications of GiD'*, Ibiza, Spain, 25-27.5.2010.
Application for use of the ERCOFTAC logo was rejected.
Application for funding was rejected.

W2010-05 *'Two-phase flow predictions'*, Halle, Germany, 22-26.3.2010.
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

W2010-06 '*Dynamics of non-spherical particles in fluid turbulence'*, Trondheim, Norway, 29.9.2010.
Application for use of the ERCOFTAC logo was approved.
A scholarship of 2000 Euros was awarded.

S2010-01 '*PIV course'*, Gottingen, Germany, 22-26.3.2010.
Application for use of the ERCOFTAC logo was approved.
Application for funding was rejected.

S2010-02 '*Non-normality and non-linearity in thermo-acoustics'*, Munich, Germany, 17-21.5.2010.
Application for use of the ERCOFTAC logo was approved.
A scholarship of 3000 Euros was awarded.

S2010-03 '*Turbulence and mixing in compressible flows'*, Oléron Island, France, 13-18.9.2010.
Application for use of the ERCOFTAC logo was approved.
A scholarship of 3000 Euros was awarded.

S2010-04 *'New challenges in turbulence research'*, Les Houches, France, 21-26.2.2010.
Application for use of the ERCOFTAC logo was approved.
A scholarship of 3000 Euros was awarded.

iii. Status of SIGs

The SPC voted to close SIG 101 *Quality and trust in industrial CFD*. Managing Board members urged greater effort in reactivating SIG 39 *Aeroacoustic* and SIG 34 *Design optimisation*.

9. Report from the Industrial Programme Committee

Dr. Lea reported on the implementation of ERCOFTAC's business plan by Dr. Seoud. Three events have been scheduled for 2009, namely: a one day seminar based on the new dispersed multiphase flow BPG, a one day event on the subject of 'New technologies in micro-heat transfer', and a two day course on 'Hybrid RANS and LES methods'. At least five events are planed for 2010, including repeats of events held in 2009. In order to promote ERCOFTAC internationally, a 'Hybrid RANS and LES methods' course could be held in the USA. Other planed events for 2010 include: a 2 day course on 'Best practice in industrial CFD', a two day event on 'Flow control', and a two day course on 'Error analysis and uncertainty in CFD'. Dr. Lea then suggested that new industrial and academic members of ERCOFTAC should be allowed to offset registration fees for such events against their first year membership fees. Prof. Hutton then suggested that the profile of ERCOFTAC can be further enhanced by organising a series of bi-annual web based ERCOFTAC lectures by senior members of the community.

Dr. Lea proposed to the Managing Board that additional marketing and research manpower was required to ensure the success of events organised by Dr. Seoud.

** The Managing Board approved the hiring of Ms. Hutton, on a one week per month basis at a rate of 500 Euros per month, to assist Dr. Seoud in the marketing and research of events and to support the QNET-CFD Knowledge Base.*

11. Composition of the SPC, IPC and MB

Dr. Borhani indicated that the membership of the SPC, IPC and MB needs to be clarified. The Management Board agreed that:

** Dr. Borhani will write to all of the Pilot Centre Coordinators asking for one research and one industrial representative for the year 2011. These will then be approved by the Managing Board and General Assembly at the Autumn ERCOFTAC committee meeting in 2010.*

** The SPC will comprise the research and industrial representatives of each Pilot Centre, and the SIG Coordinators.*

** The nature of the IPC will be considered by the Executive Committee and discussed during the Spring ERCOFTAC meeting in Delft.*

12. Status of ERCOFTAC products and services

i. ERCOFTAC Website

Dr. Lea gave a presentation of the new ERCOFTAC website which is currently under beta testing. He reported that it should be online by the end of the year. The Managing Board suggested that only ERCOFTAC members should have access to the SIG discussion forums on the website. Dr. Lea then indicated the need for a webmaster to manage the layout and content of the new website.

** The Managing Board voted to appoint Dr. Lea as the ERCOFTAC Webmaster at a rate of 4000 Euros per year.*

ii. QNET-CFD Knowledge Base

Prof. Hutton indicated the importance of the newly refurbished QNET-CFD Knowledge Base to the future of ERCOFTAC. He commented on the need for a new position on the Executive Committee charged with over seeing this project.

** The Managing Board voted to appoint Prof. Rodi to the new position of Knowledge Base Editor on the Executive Committee.*

iii. ERCOFTAC Bulletin

Dr. Borhani commented on the need to reduce the operation and the postage costs of the Coordination Centre. He reported that, after discussions with the Executive Committee, it had been decided that in the future only a single printed copy of the ERCOFTAC Bulletin will be posted to member organisation, with extra printed copies being available at an additional cost. However, free electronic copies will be made available for download from the ERCOFTAC Website by member organisations. Non-members will be able to buy printed copies of the Bulletin. The Managing Board then discussed if the Bulletin should be made available freely online to both members and non-members.

** The Managing Board voted that the table of contents of all issues and the editorials of themed issues be made freely available on the ERCOFTAC website to all. However, the full Bulletin will only be made available online to members.*

iv. ETMM8

Prof. Leschziner reported that abstracts were still being received for ETMM8 even after the deadline. He said that the abstracts will be reviewed in January 2010. He also added that around twenty organisations had been approached for sponsorship, including the French Air force who had agreed to pay for the printing of the conference proceedings.

v. ERCOFTAC Best Practice Guidelines

Prof. Hutton reported that he had taken over the creation of the second edition of the 'BPG on Industrial CFD'. Dr. Lea then said that around sixty copies of the new 'Dispersed multi-phase flows BPG' had been sold to date. He added that, in order to promote new membership, copies of both current ERCOFTAC BPGs will be made available free of charge to new ERCOFTAC members. Dr. Lea also indicated that Prof. Tomboulides was interested in creating a BPG on combustion.

13. Any other business

The Managing Board expressed its thanks to Prof. Leschziner in appreciation of his efforts as SPC Chairman during the last four years.

14. Dates and location of the next EC meeting

The next ERCOFTAC Spring Festival and Committee Meetings will be held at TU Delft on the 17-18th May 2010. The next ERCOFTAC Autumn Festival and Committee Meetings will be held in Lisbon on the 11-12th October 2010.

Navid Borhani
Lausanne, 2009.

European Research Community On Flow, Turbulence and Combustion

GENERAL ASSEMBLY MEETING

2nd October 2009, Lausanne, Switzerland

The meeting was opened by the ERCOFTAC Chairman, Prof. Hutton, at 16:30.

1. Election of ERCOFTAC Officers and Management Board members

The General Assembly voted anonymously to appoint:

- Prof. Hirsch as the ERCOFTAC 2nd Deputy Chairman: approved unanimously.
- Prof. Geurts as the ERCOFTAC SPC Chairman: approved unanimously.
- Prof. Leschziner as the ERCOFTAC SPC Deputy Chairman: approved unanimously.

2. Approval of the 2008 accounts

The 2008 accounts were approved unanimously.

3. Approval of the 2009-10 budget

The 2009-10 budget was approved unanimously.

Prof, Hutton closed the assembly at 16:40, and thanked those attending.

Navid Borhani,
Lausanne, 2009.

ERCOFTAC PC's: Coordinators, SPC, IPC MB representatives

PC Centre	Coordinator	Scientific representative	Industrial representative
Alpe-Danube-Adria	Reichl, C. christoph.reichl@ait.ac.at	Reichl, C. christoph.reichl@ait.ac.at	Tatschl, R. reinhard.tatschl@avl.com
Belgium	Geuzaine, P. philippe.geuzaine@cenaero.be	Deconinck, H. deconinck@vki.ac.be	Geuzaine, P. philippe.geuzaine@cenaero.be
Czech Republic	Bodnar, T. bodnar@marian.fsik.cvut.cz	Kozel, K. kozelk@fsik.cvut.cz	Macek, J. Jan.Macek@fs.cvut.cz
France - Henri Bénard	Cambon, C. claude.cambon@ec-lyon.fr		
France South	Braza, M. marianna.braza@imft.fr	Braza, M. marianna.braza@imft.fr	Arbez, P. ?
France West	Bonnet, J-P. jean-paul.bonnet@lea.univ-poitiers.fr		
Germany North	Gauger, N. nicolas.gauger@dlr.de		
Germany South	von Terzi, D. Dominic.Terzi@kit.edu	von Terzi, D. Dominic.Terzi@kit.edu	Menter, F. Florian.Menter@ansys.com
Germany West	Schröder, W. ek@aia.rwth-aachen.de		
Greece	Papailiou, K.D. kpapail@ltt.ntua.gr		
Iberian East	Onate, E. onate@cimne.upc.es		
Iberian West	Theofilis, V. vassilios.theofilis@upm.es		
Italy	Martelli, F. francesco.martelli@unifi.it	Rispoli, F. f.rispoli@dma.ing.uniroma1.it	Poloni, C. poloni@units.it
Netherlands	Ooms, G. G.Ooms@tudelft.nl	Ooms, G. G.Ooms@tudelft.nl	Duursma, R. rene.duursma@corusgroup.com
Nordic	Wallin, S. stefan.wallin@foi.se	Andersson, H. helge.i.andersson@ntnu.no	Wallin, S. stefan.wallin@foi.se
Poland	Drobniak, S. drobniak@imc.pcz.czest.pl		
Switzerland	Rudolf von Rohr, P. vonrohr@ipe.mavt.ethz.ch		
United Kingdom	Barton, I. Iain.Barton@baesystems.com	Choi, K-S. kwing-so.choi@nottingham.ac.uk	Carey, C. chris.carey@ansys.com

ERCOFTAC Annual General Meeting

Lisbon 12th October 2010

Election of Executive Officers

At the 2010 Annual General Meeting (AGM), it is the intention to appoint, by majority election, the following Executive Officers:

- First Deputy Chair of ERCOFTAC
- Deputy Chair of the Scientific Programme Committee
- Chair of the Industrial Programme Committee

The First Deputy Chair of ERCOFTAC will be appointed in the expectation that he/she will be confirmed as the full Chair of ERCOFTAC at the AGM in October 2012. Thus, in accordance with the ERCOFTAC Byelaws, the candidates for this office must be drawn from the Research Register, the retiring Chair being an industrial member (i.e. balance of succession).

The Pilot Centres are invited to propose candidates for these positions, by submitting the following to ercoftac@epfl.ch by Monday 27th September 2010:

- Name and contact details
- A brief CV
- A supporting statement explaining why they are keen to be considered for the office and what they feel they can bring to the role.

Please note that candidates must not be proposed if they have not first agreed to be nominated

The ERCOFTAC Executive Committee are delighted to announce that Prof. Ananias Tomboulides (University of Western Macedonia) and Dr Dominic von Terzi (Karlsruhe Institute of Technology) have agreed to be candidates for the First Deputy Chair and Deputy Chair of the SPC, respectively. The Executive Committee will be proposing these candidacies to the AGM.

ANANIAS G. TOMBOULIDES

Dept. of Mechanical Engineering
University of Western Macedonia
Bacola and Sialvera, Kozani 50100, Greece
Born December 19, 1964. Married with one child

Tel: (+30-24610) 56630
Fax: (+30-24610) 56631
e-mail: ananiast@auth.gr , atompoulidis@uowm.gr
English, Greek, good French, basic German

RESEARCH INTERESTS

Computational Methods in Reactive Flows, Combustion, Energy Systems: Development and implementation of advanced numerical methods for the simulation of reactive and non-reactive flows of fundamental as well as applied interest on parallel platforms; large-scale computing. Efficiency increase of conventional power generation from fossil and biofuels for emissions reduction.

EDUCATION

Ph.D. and M.A. Mechanical and Aerospace Engineering — June 1993
Princeton University, New Jersey USA
Topic: Direct and large-eddy simulation of wake flows: flow past a sphere

M.A. Mechanical and Aerospace Engineering — June 1989
Princeton University, New Jersey USA
Topic: Modeling of two-phase flows in spray combustion

Diploma, Mechanical Engineering — July 1987
Aristotle University of Thessaloniki, Greece

PROFESSIONAL EXPERIENCE

Professor, **University of Western Macedonia**, Kozani, Greece — January 2004 - present
Dept. of Mechanical Engineering (form. Eng. and Management of Energy Res.)

Professor, **Aristotle University Thessaloniki**, Kozani, Greece — September 2002 – December 2003
Department of Engineering and Management of Energy Resources

Senior research scientist, **ETHZ**, Zurich, Switzerland — September 2000 - September 2002
Laboratory of Aerothermochemistry and Combustion Systems
Institute of Energy Technology, Dept. of Mechanical Engineering

Assistant Professor, **Boston University**, Boston USA — October 1997 – September 2000
Department of Aerospace and Mechanical Engineering

Research scientist, **ETHZ,** Zurich, Switzerland — October 1995 - September 1997
Laboratory of Combustion Engines and Combustion Technology
Institute of Energy Technology, Dept. of Mechanical Engineering

Engineering Consultant, **Cambridge Hydrodynamics, Inc.**, Princeton, NJ USA — June 1993 - September 1998

Postdoctoral research associate, **Princeton University**, NJ USA — June 1993 - September 1995
Fluid Dynamics Research Centre

Research and teaching assistant, **Princeton University**, NJ USA — September 1987 - May 1993
Department of Mechanical and Aerospace Engineering

Teaching assistant, **Princeton University**, NJ USA — September 1989 - May 1992
Department of Mechanical and Aerospace Engineering

DISTINCTIONS/AWARDS

Boston University
Finalist among three for "Professor of the year award" June 2000
Invited participation to IMA Workshop on Low Speed Combustion October 1999

Princeton University
IBM Manufacturing Research Fellowship July 1990 - June 1992
"Top Grumman Award" for outstanding academic achievement in graduate studies (GPA4.0) October 1988
Tuition Scholarship September 1987 - June 1992

Aristotle University of Thessaloniki
Second Highest GPA in Mechanical Engineering at graduation (GPA 9.2/10) July 1987
Honorary Scholarships from National Scholarship Foundation September 1984 - June 1987

TEACHING EXPERIENCE AND INTERESTS

Aristotle University of Thessaloniki, University of Western Macedonia
Thermodynamics I, Thermodynamics II, Internal Combustion Engines, Power Generation.
Supervision of 4 doctoral candidates.

University of Macedonia
Scientific Computing, at the Graduate Program of the Department of Applied Informatics

Boston University
Graduate Course Numerical Methods for Engineers
Advanced Dynamics, Statics and Dynamics. Advanced Engineering Mathematics, Fluid Mechanics.
Supervision of 2 Master students. Faculty advisor of the ΣΙΤ Honor Students Association in Aerospace Engineering.

ETH Zurich
Graduate Seminar Course to the doctoral candidates of LAV at the Institute of Energy.
Co-supervision of 3 doctoral candidates.

PROFESSIONAL AFFILIATIONS

- Chairman of the *Department of Mechanical Engineering* UOWM (formerly Department of Engineering and Management of Energy Resources) since 1-9-2006
- Vice-Chairman of the *Dept. of Engineering and Management of Energy Resources* (UOWM) 1-9-2004 to 31-8-2006
- Committee head for the *University Network Operation Center* (UOWM) since 1-3-2004
- Member of the Organizing and Scientific Committee for *ETMM7 and ETMM8*
- Coordinator of the *ERCOFTAC Special Interest Group SIG28 on Reactive Flows*
- Secretary of the Greek Section of the *Combustion Institute*
- Member of the American *Institute of Aeronautics and Astronautics (AIAA)*
- ERCOFTAC Summer School on "Large-Eddy Simulation of Reacting Flows", Sep.5-11, Thessaloniki, Greece
- *ERCOFTAC visitor* to the Swiss Federal Institute in Lausanne (EPFL) several times in the period 1997-2000
- *ERCOFTAC visitor* to the Swiss Federal Institute in Zurich (ETHZ) several times in the period 1997-2000
- *Associate Editor for Journal "Simulation and Modelling Practice and Theory (SIMPAT)"*
- Reviewer for *Journal of Computational Physics, Combustion Science and Technology, Journal of Fluid Mechanics,* Journal of Fluids Engineering, International Journal of Heat and Mass Transfer, International Journal of Numerical Methods in Fluids, *AIAA Journal,* Flow Turbulence and Combustion, *Computers and Fluids, ECCOMAS, ETMM7, ETMM8*.

PROGRAMMING EXPERIENCE

Extensive experience with parallel computing systems using MPI; programming, optimization and parallel scalability.
Extensive experience with Fortran 77, Fortran 90 and C.

JOURNAL PUBLICATIONS

1. Instabilities of lean premixed hydrogen flames, C. Altantzis, C.E. Frouzakis, A.G. Tomboulides, M. Matalon, K. Boulouchos, submitted to *Journal of Fluid Mechanics*, 2010.
2. Detailed numerical simulations of intrinsically unstable two-dimensional planar lean premixed hydrogen/air flames, C. Altantzis, C.E. Frouzakis, A.G. Tomboulides, S.G. Kerkemeier, K. Boulouchos, *Proceedings of the Combustion Institute*, **33**, 2010.
3. Three-dimensional simulation of premixed hydrogen/air flames in microtubes, G. Pizza, C.E. Frouzakis, J. Mantzaras, A.G. Tomboulides, and K. Boulouchos*, Journal of Fluid Mechanics*, **658**, 463–491, 2010.
4. Lattice Boltzmann Method for Direct Numerical Simulation of Turbulent Flows, S. Chikatamarla, C.E. Frouzakis, I. Karlin, A.G. Tomboulides and K. Boulouchos, *Journal of Fluid Mechanics,* **656***,* 298–308, 2010.
5. Three Dimensional Simulations of Cellular, Non-premixed Jet Flames using Detailed Chemistry, A.L. Valaer, C. E. Frouzakis, P. Papas, A.G. Tomboulides and K. Boulouchos, *Combustion & Flame*, **157(4)**, 653-666, 2010.
6. Emissions' reduction of a coal-fired power plant via reduction of consumption through simulation and optimization of its mathematical model, G., P. Papanikolaou, D. Kolokotronis, N. Samaras, A. Tourlidakis and A.G. Tomboulides, *Oper. Res. Int. J.,* DOI **10.1007**/s12351-009-0053-7, 2009.
7. Suppression of combustion instabilities of premixed hydrogen/air flames in microchannels using heterogeneous reactions, G. Pizza, J. Mantzaras, C.E. Frouzakis, A.G. Tomboulides, and K. Boulouchos, *Proceedings of the Combustion Institute*, **32(2)**, p.3051-3058, 2009.
8. Dynamics of premixed hydrogen/air flames in mesoscale channels, G. Pizza, C.E. Frouzakis, J. Mantzaras, A.G. Tomboulides, and K. Boulouchos, *Combust. Flame*, **155(1-2)**, 2-20, 2008.
9. Dynamics of premixed hydrogen/air flames in microchannels, G. Pizza, C.E. Frouzakis, J. Mantzaras, A.G. Tomboulides, and K. Boulouchos, *Combustion and Flame* **152(3)**, p.433-450 2008.
10. Kinetically reduced local Navier-Stokes equations, I. Karlin, A.G. Tomboulides, C.E. Frouzakis, and S. Ansumali, *Phys. Rev.E*, **74**, 035702(P), 2006.
11. Three-dimensional numerical simulations of cellular-jet diffusion flames, C.E. Frouzakis, A.G. Tomboulides, P. Papas, P. Fischer, R. Rais, P. Monkewitz, and K. Boulouchos, *Proceedings of the Combustion Institute*, **30(1)**, p.185-192, 2005.
12. Instabilities of diffusion flames near extinction, P. Papas, M. Rais, P.A. Monkewitz A.G. Tomboulides, *Combustion Theory and Modelling,* **7**, p.603-633, 2003.
13. Remeshed Smoothed Particle Hydrodynamics for the simulation of Laminar Chemically Reactive flows, with A.K. Chaniotis, C.E. Frouzakis, J. Lee, A.G. Tomboulides, D. Poulikakos, and K. Boulouchos, *Journal of Computational Physics*, **191**, p.1-17, 2003.
14. Transient phenomena during diffusion-edge flame transitions in an opposed-jet burner: the role of edge flames, C.E. Frouzakis, A.G. Tomboulides, J. Lee, and K. Boulouchos, *Proceedings of the Combustion Institute*, **29(2)**, p.1581-1587, 2002.
15. From diffusion to premixed flames in H_2/air opposed-jet burner: the role of edge flames, C.E. Frouzakis, A.G. Tomboulides, J. Lee, and K. Boulouchos, *Combustion and Flame*, **130**, p.171-184, 2002.
16. Symmetry breaking, anomalous scaling, and large-scale flow generation in a convection cell, A.G. Tomboulides and V. Yakhot, *Physical Review E*, **63**, p.035304R, 2001.
17. The scenario of three-dimensional instabilities of the cylinder wake in an external magnetic field: A linear stability analysis, with G. Mutschke, G. Gerbeth, V. Shatrov and A.G. Tomboulides, *Physics of Fluids A*, **13(3)**, p.723-734, 2001.
18. Simulation and analysis of laminar flow reactors, with J. Lee, R. Yetter, F. Dryer, A.G. Tomboulides and S.A. Orszag, *Combustion Science and Technology*, **159**, p.199-212, 2000.
19. Observations of annular-shaped edge flames in a counterflow, P. Papas and A.G. Tomboulides, *Combustion Science and Technology Communications*, **1(7)**, p.13-17, 2000.
20. Numerical investigation of transitional and weak turbulent flow past a sphere, A.G. Tomboulides and S.A. Orszag, *Journal of Fluid Mechanics*, **416**, p.45-73, 2000.

21. New instability modes of a diffusion flame near extinction, P. Papas, P.A. Monkewitz and A.G. Tomboulides, *Physics of Fluids A*, **10(10)**, p.2818-2820, 1999.

22. Two-dimensional direct numerical simulation of opposed-jet hydrogen/air diffusion flame, C.E. Frouzakis, J. Lee, A.G. Tomboulides, K. Boulouchos, in Proc. of the *Twenty-Seventh Symposium (Intn'l) on Combustion*, The Combustion Institute, **27(1)**, p.571-577, 1998.

23. A quasi two-dimensional benchmark problem for low Mach number compressible codes, A.G. Tomboulides and S.A. Orszag, *Journal of Computational Physics*, **146**, p.691-706, 1998.

24. Numerical simulation of low Mach number reactive flows, A.G. Tomboulides, J. Lee, S.A. Orszag, *Journal of Scientific Computing*, **12(2)**, p.139-167, 1997.

25. Two and three-dimensional instabilities of the cylinder wake in an aligned magnetic fields, G. Mutschke, G. Gerbeth, V. Shatrov, A.G. Tomboulides, *Physics of Fluids A*, **9(11)**, p.3114-3118, 1997.

26. A transient two-dimensional chemically reactive flow model: Fuel particle combustion in a non-quiescent environment, J. Lee, A.G. Tomboulides, S.A. Orszag, R. Yetter, F. Dryer, in Proc. Of the *Twenty-Sixth Symposium (Intn'l) on Combustion*, The Combustion Institute, **26(2)**, p.3059-3065, 1996.

27. Direct and large-eddy simulation of the flow past a sphere, A.G. Tomboulides, S.A. Orszag, G.E. Karniadakis, *Int. Symposium on Engineering Turbulence, Modeling and Measurements*, ed. W. Rodi and F. Martelli, Elsevier, **21(6)**, 1993.

28. A new mechanism of period doubling in free shear flows, A.G. Tomboulides, G.S. Triantafyllou, G.E. Karniadakis, *Physics of Fluids A*, **4(7)**, p.1329, 1992.

29. Efficient removal of boundary divergence errors in time-splitting methods, A.G. Tomboulides, M. Israeli, G.E. Karniadakis, *Journal of Scientific Computing*, **4**, p.291, 1989.

30. On the anisotropy of drop and particle velocity fluctuations in two-phase round jets, A.G. Tomboulides, M.J. Andrews and F.V. Bracco, *Modern Research Topics in Aerospace Propulsion*, Springer Verlag, p.155, 1991.

CONFERENCE PAPERS

1. Three-dimensional Direct Numerical Simulation of Premixed Hydrogen/Air Flame Dynamic in Microtubes. G. Pizza, C.E. Frouzakis, J. Mantzaras, A.G. Tomboulides, K. Boulouchos, *European Combustion Meeting 2009*, 4/2009.

2. Linear and non-linear evolution of propagating lean H2/air premixed flames C. Altantzis, C. E. Frouzakis, A.G. Tomboulides, K. Boulouchos, *European Combustion Meetin*g 2009, 4/2009.

3. Autoignition of a diluted hydrogen jet in a heated 2-D turbulent air flow S.G. Kerkemeier, C.E. Frouzakis, A.G. Tomboulides, E. Mastorakos, K. Boulouchos, *European Combustion Meeting* 2009, 4/2009.

4. Autoignition of a diluted hydrogen jet in a heated 2-D turbulent air flow, S.G. Kerkemeier, C.E. Frouzakis, A.G. Tomboulides, E. Mastorakos, K. Boulouchos, *DNS and LES of Reactive Flows, Eindhoven*, 10/2008

5. Direct numerical simulation of turbulent flows using entropic lattice boltzmann and spectral element methods, S. S. Chikatamarla, I. V. Karlin, C. E. Frouzakis, K. B. Boulouchos, A. G. Tomboulides, *DLES7 Meeting, Trieste*, 9/2008.

6. Simulation and optimization of the working process of a coal - fired power plant, G. Tzolakis, D. Kolokotronis, N. Samaras, A. Tourlidakis, A.G. Tomboulides, *20th National Conference of the Greek Society of Operation Research*, Spetses, 6/2008.

7. Numerical investigations of an isothermal turbulent jet using Direct and Large Eddy Simulation, A.B.Gatzoulis, M.Kueng, C.E. Frouzakis, A.G. Tomboulides, K. Boulouchos, 7th International ERCOFTAC Symposium on Engineering Turbulence Modeling and Measurements, 5/2008

8. Premixed Flame Dynamics in Planar Microchannels, G. Pizza, C.E. Frouzakis, J. Mantzaras, A.G. Tomboulides, and K. Boulouchos, *European Combustion Meeting (ECM 2007)*, 4/2007.

9. Numerical Simulation of Cellular Instabilities in Jet Diffusion Flames, L. Valaer, C.E. Frouzakis, A.G. Tomboulides, and K. Boulouchos, *European Combustion Meeting (ECM 2007)*, 4/2007.

10. Υπολογιστική μελέτη της ευστάθειας σε αξονοσυμμετρική ροή με παρουσία φλόγας, I. Galionis, L. Kaiktsis, and A.G. Tomboulides, *5η Συνάντηση ερευνητικές δραστηριότητες στα φαινόμενα ροής ρευστών στην Ελλάδα*, Patras, 2006.

11. Implementation of Artificial Neural Networks (ANN) modeling in Power Plant operation optimization, E.Nanos, I.Panagiotides, A.G.Tomboulides, A.Tourlidakis, N.Samaras and K.Paparrizos, *18th National Conference of the Greek Society of Operation Research, Kozani* 6/2006.

12. Numerical Simulation of Pulsating Axisymmetric Non-premixed Jet Flames, C.E. Frouzakis, A.G. Tomboulides, P. Papas, R.M. Rais, and K. Boulouchos, *European Combustion Meeting (ECM 2005)*, 4/2005.

13. LES of turbulent diffusion flames using the Approximate Deconvolution Model, M. Kueng, A.G. Tomboulides, C. E. Frouzakis and S. Stolz, *European Combustion Meeting (ECM 2005)*, 4/2005.

14. Cellular instabilities in axisymmetric non-premixed jet flames, P. Papas, A.G. Tomboulides and C.E. Frouzakis, Proceedings of European Combustion Meeting, *European Combustion Meeting (ECM 2003)*, 11/2003.

15. Spectral element simulations of chemically reactive flows, C.E. Frouzakis, J. Lee, A.G. Tomboulides and K. Boulouchos, Proceedings of Computational methods for multi-dimensional reactive flows, COMREF 12/2002.

16. Sensitivity analysis of spray models in DI Diesel engines, M. Kueng, Y.M. Wright, A.G. Tomboulides and K. Boulouchos, Proceedings of ILASS-Europe Meeting, 6/2001.

17. Near-Extinction Instability Modes of Diffusion Flames, P. Papas, P.A. Monkewitz and A.G. Tomboulides in, Proceedings of Joint meeting of the US sections of the Combustion Institute, 3/1999.

18. Observations of tribrachial flames produced in a counterflow, P. Papas amd A.G. Tomboulides, Proceedings of Eastern States Section of the Combustion Institute Meeting, 10/1997.

19. Recent successes, current problems, and future prospects of CFD, S.A. Orszag, V. Borue, W.S. Flannery, A.G. Tomboulides, AIAA-97-0431, 1/1997.

20. Droplet combustion in a low Reynolds number flow environment, J. Lee, A.G. Tomboulides, A.J. Marchese, R. Yetter, F. Dryer, and S.A. Orszag, Proceedings of Eastern States Section of the Combustion Institute Meeting, p.357-360, 12/1996.

21. Asymptotic and numerical analysis of laminar flow reactors, J. Lee, A.G. Tomboulides, R. Yetter, F. Dryer, and S.A. Orszag, Proceedings of 3rd Workshop on Modeling of Chemical Reaction Systems, 7/1996.

22. Simulation of pipe flow, Y. Zhang, A.G. Tomboulides, A. Gandhi, S.A. Orszag, Proc. of AGARD 74th Fluid Dynamics Symposium on application of direct and large eddy simulation to transition and turbulence, AGARD volume CP-551, p.17.1-17.9, 4/1994.

23. Direct and large-eddy simulation of axisymmetric wakes, A.G. Tomboulides, S.A. Orszag, and G.E. Karniadakis, AIAA-93-0546, 1993.

24. Three-dimensional direct simulation of flow past a sphere, A.G. Tomboulides, S.A. Orszag, and G.E. Karniadakis, Proceedings of US National Congress of Applied Mechanics, 5/1990.

CONFERENCE ABSTRACTS

1. Linear stability and long-time evolution of planar lean premixed H2/air flames, C. Altantzis, C. E. Frouzakis, S. Kerkemeier, A. G. Tomboulides, K. Boulouchos, APS 62nd Annual Meeting, Division of Fluid Dynamics, 11/2009.

2. Numerical Simulations of Jet Diffusion Flame Pulsations Close to Extinction, C. E. Frouzakis, A.G. Tomboulides, P. Papas, L. Kaiktsis, and K. Boulouchos (Work-in-Progress Poster Session 5E02, 31st Symposium (International) on Combustion, Heidelberg; 8/2006.

3. Computational investigation of non-premixed combustion applications, A. Gatzoulis, A.G. Tomboulides, C.E. Frouzakis, and K. Boulouchos, *Proceedings of the Marie-Curie Conference "Making Europe more attractive for researchers",* Pisa, Italy, 9/2005.

4. Simulation of engine combustion – which approach for which purpose, with K. Boulouchos, M. Kueng, T. Koch, Y. Wright, A.G. Tomboulides and G. Weisser, Proc. of Virtual Engine Congress, Munich, 10/2002.

5. Reynolds number scaling of Large Eddy Simulations of strongly non-linear fluids, V. Yakhot, M. Kueng and A.G. Tomboulides, Proc. of the IUTAM Symposium on Reynolds Number Scaling in Turbulent Flow, Princeton, 9/2002.

6. Direct numerical simulation of H_2/air edge flames stabilized on an opposed-jet burner, C.E. Frouzakis, J. Lee, A.G. Tomboulides and K. Boulouchos, Joint International Combustion Symposium of the International Energy Agency, Kauai, Hawaii, 9/2001.

7. Simulationsmethoden der Gemischaufbereitung, Verbrennung und Nox-Bildung im Motor, K. Boulouchos, M. Kueng, Y. Wright, A.G. Tomboulides, and G. Weisser, Dresdner Motorenkolloquium, TU-Dresden, 6/2001.

8. Numerical Simulation of Non-premixed Counterflow Flames and Reacting Mixing Layers, A.G. Tomboulides, Workshop on Low Speed Combustion, IMA, University of Minnesota, 9/1999.

9. New Instability Modes in a Diffusion Flame near Extinction, P. Papas, A.G. Tomboulides and P. A. Monkewitz, Presented at the 1st Joint Meeting of the US Sections: The Combustion Institute, Washington, DC, 3/1999.

10. Simulation of flame-vortex interactions in abrupt symmetric expansions, A.G. Tomboulides and K. Boulouchos, 1st Meeting of the Greek Section of Combustion Institute, 11/1997.

11. The Stability of a Jet Diffusion Flame, P. Papas, A.G. Tomboulides, P.A. Monkewitz, and K. Boulouchos., Presented at the ERCOFTAC Meeting, ETH-Zürich, 6/1997.

12. Simulations of 3D Convection with Rotation and Magnetic Fields, A.G. Tomboulides and S.A. Orszag, International Workshop on Hydrodynamic Aspects of Electron Beam Technologies, 3/1997 (invited lecture).

13. Application of resonant holographic interferometry to OH concentration measurements in a 2D CO-flow H_2/air diffusion flame and comparison with direct numerical simulations, A.P. Tzannis, P. Beaud, H.M. Frey, T. Gerber, B. Mischler, P.P. Radi, J.C. Lee, A.G. Tomboulides, and K. Boulouchos, Twenty-Sixth Symposium (Intn'l) on Combustion, 8/1996.

14. Computational study of laminar flame stabilization in abrupt expansions, C. E. Frouzakis, A.G. Tomboulides, L. Kaiktsis, and K. Boulouchos, Twenty-Sixth Symposium (Intn'l) on Combustion, 8/1996.

15. Direct and Large Eddy Simulation of Turbulent Pipe Flow with Spectral Method, Yansi Zhang, A.G. Tomboulides and S.A. Orszag, SIAM Annual Meeting, 10/1995.

16. Simulation of low Mach number reacting flows, A.G. Tomboulides and S.A. Orszag, 32nd annual meeting of the Society of Engineering Science, 10/1995.

17. Viscous-sponge outflow boundary conditions for incompressible flows, A.G. Tomboulides, M. Israeli, and G.E. Karniadakis, Minisymposium on Open Boundary conditions, Stanford University, 6/1992.

18. Transitional and turbulent flow past a sphere, A.G. Tomboulides, S.A. Orszag, and G.E. Karniadakis, APS 45th Annual Meeting, Division of Fluid Dynamics, 11/1992.

19. Three-dimensional simulation of flow past a sphere, A.G. Tomboulides, S.A. Orszag and G.E. Karniadakis, *Proc. 1st ISOPE-91 Conf., Edinburgh*, 6/1991

20. Three dimensional simulation of flow past a sphere, A.G. Tomboulides, S.A. Orszag, and G.E. Karniadakis, APS 43rd Annual Meeting, Division of Fluid Dynamics, 11/1990.

INVITED PRESENTATIONS

1. January 2010. Institut Francais du Petrol, Paris, France, Numerical simulation of combustion instabilities.

2. October 2008. TU-Eindhoven, Netherlands, Department of Mechanical Engineering, DNS and LES of Reacting Flows.

3. April 2008. TU-Darmstadt, Germany, Department of Mechanical Engineering, Institute of Energy and Power Engineering, Numerical simulation of combustion instabilities.

4. April 2008. Regional Administration of Western Macedonia, Kozani, Regional Innovation Pole of Western Macedonia, Technology Platform workshop on "Energy potential and sustainable technologies in Western Macedonia".

5. September 2007. TU Berlin, ERCOFTAC Summer School on Direct Numerical Simulation of Reacting and two-phase Flows.

6. May 2007. University of Rouen, France, Large-Eddy Simulation for advanced design of combustion systems, methods, tools and applications.

7. April 2007. TU-Berlin, Germany, Institute of Fluid Mechanics, Department of Aerospace Engineering, Reacting flow activities and future plans of SIG28.

8. October 2006. National Technical University of Athens, Greece, Flow, Turbulence and combustion research activities in Greece.

9. September 2004. Aristotle University of Thessaloniki, Greece, ERCOFTAC Summer School on Large-Eddy Simulation of Reacting Flows.

10. March 2003. TU-Dresden, Germany, Department of Aerospace Engineering, Spectral element simulations of low-speed incompressible and compressible flows.

11. March 2002. ERCOFTAC Summer School on Introduction to Numerical and Experimental Methods Combustion Research, ETH Zurich, Switzerland, Two-phase flow modeling.

12. September 2000. ERCOFTAC Summer School on Introduction to Numerical and Experimental Methods Combustion Research, ETH Zurich, Switzerland, Two-phase flows with emphasis on sprays.

13. November 1999. National Institute of Standards and Technology, Building and Fire Research Lab., Gaithersburg, MD, USA, Numerical Simulation of Low Speed Reactive Flows: Applications to Non-Premixed Counter-flow Flames and Reacting Mixing Layers.

14. October 1999. Yale University, New Haven CT, USA, Department of Mechanical Engineering, Numerical Simulation of Non-premixed Counterflow Flames and Reacting Mixing Layers.

15. October 1999. Institute for Mathematics and its Applications, Minneapolis MN, USA, Workshop on Low Speed Combustion, Numerical Simulation of Non-premixed Counter-flow Flames and Reacting Mixing Layers.

16. April 1999. The Pennsylvania State University, State College PA, USA, Department of Mechanical and Nuclear Engineering, Numerical Simulation of reactive and thermally driven flows.

17. April 1998. MIT MA, USA, Sloan Automotive Laboratory, Dept. of Mechanical Engineering, Numerical simulation of reacting flows.

18. March 1997. Northwestern University, Evanston IL, USA, Department of Engineering Sciences and Applied Mathematics, Simulation of low Mach number reacting flows.

19. December 1996. Hiltonhead Island, SC, USA, Eastern States Section of the Combustion Institute Meeting, Droplet combustion in a low Reynolds number flow environment.

20. April 1996. EPF Lausanne, Switzerland, Institute of Fluid Mechanics, Numerical simulation of reacting flows.

21. February 1996. Paul Scherrer Institute, Villigen, Switzerland, Numerical simulation of low Mach number combustion.

22. October 1995. New Orleans LA, USA, 32nd annual meeting of the Society of Engineering Science, Simulation of low Mach number reacting flows.

23. February 1995. University of California, Los Angeles CA, USA, Department of Mathematical Sciences, Simulation of low Mach number reacting flows.

24. March 1994. University of Delaware DE, USA, Department of Mechanical Engineering, Numerical simulation of wake flows: flow past a sphere.

25. March 1993. ETH Zurich, Switzerland, Department of Mechanical Engineering, Direct and large-eddy simulation of axisymmetric wakes.

26. May 1990. Tucson AZ USA, US National Congress of Applied Mechanics, Three-dimensional direct simulation of flow past a sphere.

RESEARCH GRANT PARTICIPATION

1) Title: *Large-Eddy and System Simulation to predict Cyclic Combustion Variability in gasoline engines (LESSCCV)*
Agency: EC FP7-SST-2008 233615
Institute: Department of Mechanical Engineering, University of Western Macedonia, Kozani
Duration: December 2009 – November 2012
Budget: 300000€
Principal Investigator

2) Title: *Developing Innovation and Research Environment in five European Regions in the field of Sustainable Use of Biomass Resources (BIOCLUS)*
Agency: EC FP7-REGIONS-2009-1
Institute: Department of Mechanical Engineering, University of Western Macedonia, Kozani
Duration: December 2009 – November 2012
Budget: 198600€
Principal Investigator

3) Title: *Vehicle Concept Modeling (VECOM)*
Agency: PITN-GA-2008- 213543
Institute: Department of Mechanical Engineering, Aristotle University of Thessaloniki
Duration: October 2008 –September 2012
Budget: 262643€
Scientific Responsible
Principal Investigator: Zisis Samaras

4) Title: *Regional Innovation Pole of Western Macedonia – SynEnergia*
Work Package A2: Advanced measures for the optimization of the operation of lignite power plants for the reduction of CO2 emissions.
Agency: General Secretariat of Research and Technology
Institute: University of Western Macedonia, Kozani
Duration: November 2006 – October 2008
Budget: A2 490,000€ (Total: 2,910,000€)
Principal Investigator

5) Title: *Energy saving, emissions reduction, improvement of functional characteristics and efficiency through the development and application of modern analysis methods.*
Agency: General Secretariat of Research and Technology, PENED03
Institute: University of Western Macedonia
Duration: October 2005 – September 2008
Budget: 172925€, Principal Investigator

6) Title*: Development and Support of Telematic Services at the University of Western Macedonia*
Agency: Information Society
Institute: University of Western Macedonia
Duration: September 2005 – March 2007
Budget: 96712€
Principal Investigator

7) Title*: Development of Innovation in the field of Energy: Analysis concerning subcontracting by the GPPC*
Agency: Chamber of Commerce of Kozani
Institute: University of Western Macedonia
Duration: July 2005 – June 2006
Budget: 38000€
Principal Investigator

8) Title: *Development of modern methods of analysis and optimization of energy production systems in thermoelectric power stations aiming at energy savings and reduction of pollutants emissions*
Agency: Regional administration of Western Macedonia
Institute: University of Western Macedonia
Duration: December 2005 – December 2006
Budget: 265000€
Principal Investigator

9) Title: *Computational investigation of non-premixed combustion applications*
Agency: EC FP6-2002-Mobility-12 508069
Institute: Department of Energy Resources Management and Engineering, AUTH Kozani
Duration: April 2004-April 2006
Budget: 109130€
Principal Investigator

10) Title: *Large-Eddy Simulation for turbulent non-premixed combustion*
Agency: ETHZ, Swiss Federal Office of Energy (BFE) Project 43099
Institute: Laboratory of Combustion Engines and Combustion Technology, ETH Zurich
Duration: October 2001-September 2004
Budget (LVV/ETHZ part): 125000CHF
External Collaborator
Principal Investigators: K. Boulouchos, L. Kleiser

11) Title: *Instabilities in diffusion flames*
Agency: Swiss National Science Foundation
Institute: Laboratory of Combustion Engines and Combustion Technology, ETH Zurich
Duration: April 1997-August 2000
Budget: 307000CHF,
Scientific Responsible
Principal Investigators: K. Boulouchos, P. Monkewitz

12) Title: *Experimental and numerical investigation of the liquid-fuel/air premixing process in lean premixed gas turbine combustors.*
Agency: Swiss Federal Office of Energy (BFE), ABB
Institute: Laboratory of Combustion Engines and Combustion Technology, ETH Zurich
Duration: January 1996-December 1999
Budget (LVV/ETHZ part): 110000CHF,
Scientific Responsible
Principal Investigator: K. Boulouchos

13) Title: *Common-rail based improved combustion for low emissions*
Agency: EC G3RD-CT99-0001, under the Competitive and Sustainable Growth Program 1998-2002
Institute: Laboratory of Combustion Engines and Combustion Technology, ETH Zurich
Duration: February 2000-February 2003
Budget (LVV/ETHZ part): 298000CHF
Scientific Responsible
Principal Investigator: K. Boulouchos

14) Title: *Advanced Modeling of InP Crystal Growth by the MLEK process*
Agency: US Department of Defense, Air Force
Institute: Cambridge Hydrodynamics Inc. Princeton
Duration: September 1997-August 1998, Budget: 105000USD,
Scientific Responsible
Principal Investigator: S. A. Orszag

15) Title: *Physicochemical Processes in Hydrodynamics*
Agency: Advanced Research Project Agency (ARPA), Office of Naval Research (ONR)
Institute: Department of Mechanical and Aerospace Engineering, Princeton University
Duration: June 1995-August 1997
Budget: 700000USD, Participant; Principal Investigator: S. A. Orszag

ANANIAS G. TOMBOULIDES

I studied Mechanical Engineering at the *Aristotle University of Thessaloniki*, Greece, where I obtained my diploma in 1987, and continued to earn my M.A. and Ph.D. degrees in Mechanical and Aerospace Engineering from *Princeton University* in 1993. After spending two years as a post-doctorate research associate at the Fluid Dynamics Research Center at Princeton University, I became a Research Scientist at the Institute for Energy Technology of the *Swiss Federal Institute of Technology in Zurich (ETHZ).* In 1997 I joined the department of Aerospace and Mechanical Engineering of *Boston University* as an Assistant Professor where I taught until 2000. After spending few years as a Senior Research Scientist at ETH Zurich, in 2003 I was hired as a Professor of Thermodynamics and Thermal Engines at the Department of Engineering and Management of Energy Resources of the *Aristotle University of Thessaloniki*. The department is located in Kozani, in the region of Western Macedonia, where more than 60% of the electric power of Greece is produced from coal, which is the main fuel used for electricity generation in the country by the Greek Public Power Corporation. In 2004, my department became part of the newly established *University of Western Macedonia*, and was renamed *Department of Mechanical Engineering*.

My **research interests** are mainly in the area of energy and more specifically in high fidelity large-scale computations of chemically reacting flows in combustion as well as in materials processing and in energy systems. The main focus is on the development and implementation of accurate and efficient high-order methods for the simulation of phenomena of fundamental and applied interest. I have worked on the development of novel numerical algorithms and on their verification and have also performed extensive code development for the efficient and scalable implementation of these numerical algorithms in various computational environments. On the other hand, the application of the developed technologies towards the understanding of specific problems of fundamental and applied interest was always the underlying primary goal.

I had the opportunity to serve in several **academic administrative positions**, including Department Vice Chairman (2004-2006) as well as Department Chairman for the past 4 years (2006-2010). During these years, our newly founded department became one of the five Mechanical Engineering departments in Greece and has established important long-term collaborations with the Power Generation industry in the region. It has grown in faculty from 6 to 14, has secured funding of 3.3M€ for its laboratory infrastructure and has participated in a number of European and National research projects. More importantly, the level of students entering our department through the National Examination System has gone up from about 15/20 to 18.1/20 (compared with 18.7/20 and 19.1/20 in the Universities of Thessaloniki and Athens, respectively), which means that only students that have excelled in the national exam system can now enter. Since 2006, I had the pleasure to serve as coordinator of ERCOFTAC's Special Interest Group 28 (SIG28) on Reactive Flows. My involvement with SIG28 has given me the opportunity to collaborate with several prominent colleagues from all over Europe and to appreciate ERCOFTAC's leading role in the promotion of scientific and industrial FTAC activities in Europe as well as worldwide.

In closing, I have given this opportunity a great deal of thought and would be honored to be a candidate for the first Deputy Chair of ERCOFTAC. I realize that this position will require a great deal of time and effort for which I am willing and eager to commit if ERCOFTAC's Executive Committee believes I am a suitable candidate and proposes me at the Lisbon AGM. If elected in October, I will be happy to work with the Chairman and the rest of the Executive Committee during the next two years and to assist in promoting ERCOFTAC's strategic vision, i.e. to maintain and enhance its position as the leading European association of research, education and industry groups in the technology of flow, turbulence and combustion. I believe that my previous research, teaching and organizational experience will allow me to contribute to this goal.

CV Dominic von Terzi

Dr Dominic von Terzi studied Aerospace and Mechanical Engineering in Stuttgart, Germany, and Tucson, Arizona. In 2004, he obtained his PhD in Aerospace Engineering with a minor in Applied Mathematics from the University of Arizona. Following employments as researcher at the Universities of Arizona, Karlsruhe, and Dresden, Dominic is heading the independent research group "Turbo-DNS" at the Karlsruhe Institute of Technology (KIT) in Germany since 2007. His current research focus is on turbulent flows and heat transfer in turbomachines. Dominic is an expert on hybrid RANS/LES methods and has extensive experience in high-performance computing for Computational Fluid Dynamics, in particular studying large coherent structures, transition to turbulence, and flow control with Direct Numerical Simulation (DNS) and Large-Eddy Simulation (LES). In these fields, Dominic received the "Golden Spike Award" of the German HPC-Center in Stuttgart, has more than 20 invited conference contributions, lectures and seminars, and published roughly 100 articles in journals, conference proceedings, books, etc. In addition, he is a founding member and the vice-chair of the Young Investigator Network (YIN). YIN is a network for the independent research group leaders at KIT and has more than 50 members. Since 2008, he is coordinator of the ERCOFTAC pilot centre "Germany South" and represents its ERCOFTAC members in the Scientific Programme Committee. For ERCOFTAC, Dominic also serves in the Steering Committee of SIG-15 "Turbulence Modelling," as juror of the da Vinci Award and as lecturer for the Best Practice Guidance Course series.

Supporting statement by Dominic von Terzi

I am honored to have been proposed by the Executive Committee of ERCOFTAC as Deputy Chair of the Scientific Programme Committee (SPC). ERCOFTAC, for me, is a home where the academic and industrial communities and different generations of researchers in the fields of flow, turbulence and combustion can meet, exchange ideas, transfer knowledge and create fruitful collaborations. However, a community can only be strong and active if there are sufficient contributions of its members. For this reason, I have been engaged within ERCOFTAC in many areas, e.g. as coordinator of a pilot centre, member of the SPC and of the Steering Committee of a SIG, referee of its journal, juror of the da Vinci Award, and a lecturer for the Best Practice Guidance Course series. I think I can contribute even further and bring fresh ideas and youthful enthusiasm to the table. For example, I have gained some expertise in founding and (vice-)chairing a dynamic network of young independent scientists in Karlsruhe. Our approach is currently being copied at other German universities and serves as an example of how creativity can be fostered by academic freedom and interdisciplinary collaborations. It is the same underlying spirit I believe to be at the core of ERCOFTAC. Therefore, I will accept the honor to serve as Deputy Chair of the SPC if elected.

ERCOFTAC 2011 SIG Funding Applications

To be considered at the SPC meeting in Lisbon on the 12th October 2010.

SIG

28 Reactive flows

33 Transition mechanisms, prediction and control

35 Multipoint Turbulent Structure and Modelling

42 Synthetic models in turbulence

SIG28 Activities: ERCOFTAC Autumn SPC Meeting Lisbon, October 12, 2010

The events that should be listed as **upcoming events for 2011**:

1. 2nd International Workshop on Measurement and Computation of Turbulent Spray Combustion (TCS 2) in Corsica, June 7, 2011

2. Highly Resolved Experimental and Numerical Diagnostics for Turbulent Combustion (HRTR-1) in May 25-26, 2011.

SIG28 events **listed as past events for 2010**:

1. A Summer Schooland Workshop in 2010 on ""“Non-normality and non-linearity in thermo-acoustics” at TU Munich in May 17-20, 2010, organized by W.Polifke.

2. In preparation of a TOC on BPG on Combustion with D. Roackerts, P. de Goey, W. Polifke, M. Pfitzner for discussion with SPC about funding

SIG28 events **listed as past events in 2009**:

1. a workshop on Turbulent Spray Combustion organized by Bart Merci and Dirk Roekaerts in Corsica, June 7, 2009 (report enclosed).

2. A Technology Awareness Day on "Advances in Mixing and Combustion: Architectures, Measurement Techniques and Numerical Modelling", which took place **April 8, 2009** in Munich

3. Organized a meeting of all members of SIG28 on April 14, 2009 in Vienna during the European Combustion Meeting; the meeting was attended by about 10 SIG28 members.

SIG28 events **listed as past events in 2008**:

1. The JM Burgers Centre course on Combustion, which took place May 6-9, 2008 at Maastricht and was organized by TU/e in Eindhoven.
2. a workshop on 'DNS and LES of reacting flows' October 22-24, 2008 in Eindhoven
3. The "LES for Combustion and on Transition Modelling" event that took place in November 2007 at Ghent.
4. a workshop on "LES and DNS of ignition processes and complex structure flame with local extinction" organized by Andjei Boguslawski at Czestochova University in Poland, November 20-21st, 2008
5. A Combustion meeting in Erlangen March 2008, in the German language

Application for financial support (2011): SIG 33 Transition Mechanisms, Prediction and Control

(i) A statement of activities over the preceding two years:

- 7th ERCOFTAC SIG33 - FLUBIO Workshop in Santa Margherita Ligura (GE), Italy, October 16-18, 2008.
- FLOW-ERCOFTAC Summer school in Flow Control and Optimization, Jun. 29 - Jul. 3, 2009.
- 8th ERCOFTAC SIG33 Workshop, Global Instabilities of Open Flows, Nice, France. June 30 - July 2, 2010.
-

(ii) A plan of activities for the years 2011/12:

- A workshop is planned in Toledo, Spain, Sept. 2011.
- A workshop will be hold in 2012 (place and date not fixed yet).

(iii) A statement on input to the ERCOFTAC website:

- Homepage of SIG33 has been held updated continuously since 2006.

(iv) A commitment to the Concordate.

- The SIG has already committed to follow the Concordate.

SIG 35, Multipoint Turbulent Structure and Modelling: Recent, past activities and plans (dated October first 2010)

Claude Cambon, Coordinator (also coordinator of the 'Centre Henri Bénard' PC)
Laboratoire de Mécanique des Fluides et d'Acoustique, UMR 5509,
Ecole Centrale de Lyon, 69134 Ecully Cedex, France.

The last similar document was sent in September 2009.

Brief Reminder of topics: SIG 35, or 'Multipoint Turbulence Structure & Modelling', MPTSM hereinafter, does share a part of the domain of turbulence modelling with, e.g., SIG 15, but from a more fundamental viewpoint. An important overlapping also exists with LES-SIG 1, SIG 14 and SIG 4, and some other ones (not to mention the close connection with the recently established SIG 42, rediscussed below.)

The list of themes given in the ERCOFTAC website remains valid, with the purpose to promote applications. All the following aspects must be oriented towards applications to geophysical, environmental and industrial complex flows: Lagrangian statistics and dynamics, multipoint (and therefore multiscale) approach, structuring effects of mean gradients and body forces on (highly anisotropic) turbulent flows, wave-vortex dynamics, fractal structure and forcing. More effort is expected for improving practical LES, and the refined investigation of *two-time* two-point statistics/dynamics is useful for turbulent diffusion (passive tracers, pollutants, slow chemistry), as well as for aero-acoustics.

The last aspect is an important topic of the SIG 42, 'Synthetic Turbulence Models', established in 2007. Double labelling, SIG 42 and SIG 35, was used in previous meetings, the last one being Warsaw (July 2009). Now we prefer to separate the events, in order to preserve the individual career of both SIG's.

Dynamical aspects are essential in SIG 35, with fully nonlinear theory and modelling, supported by very high resolution DNS and LES, and close contact with scientists involved in the ITER (controlled nuclear fusion) project, geodynamo and astrophysics. For instance, we will continue to promote progress towards turbulence in fluids, MHD (MagnetoHydroDynamics) flows and plasmas, in which Lagrangian diffusion is altered by waves (inertia, gravity, Alfvén, etc., and combination of them) more than by coherent vortices. Mixing by vortices is dominant in engineering flows, whereas impact of waves is increasingly relevant from 'hydro' geophysics to plasma physics.

Application to modelling of turbulence in compressible, high-speed, flows is important and has impact on engineering flows: Past events ('Turbulence and mixing II', Marseille, Summer School, July 2007, and 'ASTROFLU' workshop in Lyon, November 2008) illustrate this contribution of SIG 35 to activities of SIG 4, which was reinforced on the occasion of the next Summer School (Turbulence and mixing III, Oléron island.)

1 Past activities (from 2007)

The SIG 35 was established with a kick-off meeting held in Imperial college, London, May 10th 2001. *The SIG received a specific financial support from ERCOFTAC in 2007, 2008 and 2009.* From 2006, the following meetings took place:

- ERCOFTAC/SIG 35 workshop, Luminy (near Marseille), November 13-14, 2006, *3D structure and Lagrangian aspects in turbulence for fluids and plasmas*, co-organised by Kai Schneider and Claude Cambon. Given the short notice after the first proposal submitted to the SPC meeting (Athens, 2006), no scholarship was obtained.

- IMS/ERCOFTAC/SIG 35/COST 20 workshop, IC London, March 26-28, 2007, *Interscale energy transfer in various turbulent flows*, co-organized by Claude Cambon, Arkadi Tsinober, & Christos Vassilicos. Report in ERCOFTAC bulletin 73, June 2007.

- ERCOFTAC/SIG 35 workshop, Sheffield (UK), May 29-30 2007, *Synthetic turbulence models I*, co-organized by Franck Nicolleau, Claude Cambon & Christos Vassilicos. Report in ERCOFTAC bulletin 75, December 2007.

- Summer school, Cargèse (Corsica), August 13-25, 2007, *Small-scale turbulence: theory, phenomenology and applications*, coorganised by Luminita Danaila (Sig's new young member), Philippe Petitjeans & Alain Noullez. *Both SIG's 4 and 35 were involved, as well as France-West and Centre Henri Bénard PC's.* Report in the ERCOFTAC bulletin 75, December 2007.

- ERCOFTAC/SIG 14/SIG 35/SIG 42 workshop, CUM, Vilanova, November 29-30 2007, *Synthetic turbulence models II*, co-organized by Jose Redondo, Franck Nicolleau and Claude Cambon. Report in ERCOFTAC bulletin 76, March 2008.

- International workshop, CIRM, Luminy (near Marseille), April 21-25 2008, *Multiscale methods for fluid and plasma turbulence : Applications to magnetically confined plasmas in fusion devices*, co-organized by Marie Farge and Kai Schneider. No scholarship requested.

- ERCOFTAC/SIG 42/SIG 35 workshop, Newcastle (UK), July 3-4 2008, *Synthetic turbulence models III*, co-organized by Elena Meneguz, Andrew Baggaley, Mike Reeks, Franck Nicolleau, & Claude Cambon. Report in ERCOFTAC bulletin 79, December 2008.

- ERCOFTAC/Henri Bénard PC and SIG 35 workshop, Lyon, November 12-13, 2008, *ASTROFLU colloquium*, co-organized by a local committee from both ENS-Lyon and ECL-Lyon. This joint meeting gathered astrophysicists and specialists of fluid mechanics, in order to identify common themes and to launch collaborations. It was also a follow-up of the Summer School on 'Turbulence and mixing in compressible flows II' held in Marseille in July 2008.

- Conference TI-2009, Sainte Luce, La Martinique (French oversea department), May 31-June 5 2009, *Turbulence & Interaction*, co-organized by Michel Deville, Thiên Hiêp Lê, and Pierre Sagaut. *Both Henri Bénard PC and SIG 35 were involved. Pierre Sagaut is a very active participant of the Henri Bénard PC.*

- International ERCOFTAC/SIG 42/SIG 35 workshop, Warsaw (Poland), July 1-3 2009, *Workshop on synthetic turbulence models and vortex flows*, co-organized by Andrzej Nowakowski, Konrad Bajer, Jacek Rokicki, Franck Nicolleau & Claude Cambon. Report in ERCOFTAC bulletin 81, December 2009.

- **W2009-12** ERCOFTAC/Henri Bénard PC and SIG 35 workshop, Lyon, December 7-8 2009, *Velocity gradients and increments, dynamics and statistics, in turbulent flows with effect of rotation, stratification and/or MHD*, co-organized by Aurore Naso, Franck Nicolleau, Fabien S. Godeferd & Claude Cambon. Report in ERCOFTAC bulletin ?

- Winter School, Ecole de physique des Houches (France), February 21-26, 2010, *New challenges in turbulence research*, co-organized by Mickael Bourgoin, Bernard Rousset, Jean-François Pinton & Claude Cambon. Both SIG 35 and Henri Bénard PC were involved. Four themes were addressed: Cryogenic turbulence, new sounding experiments, strongly anisotropic turbulence, real-life particle motion in turbulent flows. Report submitted to the ERCOFTAC bulletin.

2 Plan of activities and initiatives in 2011 and 2012

The last SIG 35 workshop in 2010 is as follows:

ERCOFTAC/SIG 35 workshop, CIRM, Luminy (near Marseille), October 4-6 2010, *Instabilities, turbulence and interactions in rotating shear flows*, co-organized by Kai Schneider, Thierry Lehner & Claude Cambon.

The last Winterschool in February 2010 was considered as very successful, so that we will render it bi-annual, with the next one in Winter 2012.

Next year, a workshop at smaller scale with label SIG 35 is planed as a follow-up, as *Workshop on statistical mechanics, fractals, instabilities, turbulence in fluids and superfluids*, to be held in Paris, April 13-15.

In addition to the themes addressed in the last Winterschool, a very important new one will be 'from stable stratification to instable cases'. Stably stratified turbulence with and without rotation is a long-term topic in SIG 35, particularly in Lyon. New recent elements yield to re-attack, with the tools of MPTSM, buoyancy-driven flows such as thermal convection (destabilising temperature gradient) and even Rayleigh-Taylor instability with transition to turbulence. Collaboration with the CEA (A. Llor, B-J Gréa) is particularly encouraging, from spectral approaches (RDT, nonlinear closures,) supported by high resolution DNS towards LES to engineering-oriented models, like bi-fluid $k - \varepsilon$. This theme is also important for the SIG 14.

Another small workshop will take place on the same topic, probably in Autumn 2011, in possible connection with the 'Pan-european non-Homogeneous Lab.' project of Jose Redondo.

SIG 35 will be involved in the next Summerschool *Morphology and dynamics of anisotropic flows*, to be held in Cargese, Corsica, July 18-30 2011, with Luminita Danaila as main organiser.

Finally, contacts are in progress with the group of Bernard Knaepen, Université Libre de Bruxelles, for organising a SIG 35 workshop on MHD (Magnetohydrodynamics), with DNS, LES, spectral closures and structure-based modelling. A contribution from the group of Stavros Kassinos (University of Cyprus) is expected.

3 Agreement with the 'concordat'

We confirm our agreement with the concordat and in particular our commitment to attending SPC meetings.

SIG 42, Synthetic models in turbulence

Franck Nicolleau, Coordinator
Department of Mechanical Engineering, The University of Sheffield, UK.

September 14, 2010

This is the application for fundings for the year 2011.

Brief Reminder of the context:

Synthetic Turbulence Models (STM) include any turbulence model based on prescribing or constructing an Eulerian velocity field in order to meet some of turbulent flows' physical properties. The idea is not to solve the Navier Stokes equations directly or through some closures but to find the ingredients necessary to repeat or understand some of turbulence properties.

A popular STM is the Kinematic Simulation (KS) where flow realizations with complete spatial, and sometime spatio-temporal, dependency, are generated via superposition of random modes, with prescribed constraints: strict incompressibility (divergence-free velocity field at each point), prescribed high Reynolds energy spectrum, ...

Such an approach is widely used in various domains including Lagrangian aspects in turbulence mixing/stirring, particle dispersion/clustering, and, aeroacoustics. Recent improvements consisted in incorporating linear dynamics, for instance in rotating and/or stably- stratified flows and boundary effects e.g. flow in pipes or channels.

Brief Reminder of topics:

- homogeneous isotropic KS, multi-particle dispersion, particle with inertia, particle clustering, ...
- cloud physics, prediction of droplet size distribution due to condensation,
- anisotropic KS, stratification and rotation, MHD,
- KS for aero-acoustics,
- KS with boundary conditions, dispersion in a pipe or a channel,
- KS as a Lagrangian sub-grid, for LES, DES, industrial applications,
- Synthetic models as a tool for generating look-a-like data as an alternative to stochastic models, the placebo technique, Multiscale Lagrangian Map Approach, minimal map synthetic turbulence for Eulerian applications, in particular study of intermittency and anomalous scalings,
- KS in quantum mechanics, fluctuation dynamo, simulations of quantized vortices, superfluids.

1 Past activities

SIG 42 is now in its 3rd year, it was set up after a meeting in London IMS/ERCOFTAC/SIG 35/COST 20 workshop, IC London, March 26-28, 2007, where it appeared that there was a KS community and a critical mass of researchers to justify the creation of a new SIG dedicated to KS. To get its appeal broader and attract more people the new SIG was named 'Synthetic models in turbulence' as KS is thought of in a broader context, as an approach rather than a specific Lagrangian modelling.

So far six workshops have been organised.

- SIG 35 1st workshop on Synthetic Turbulence (Sheffield 29th-30th May 2007). *ERCOFTAC bulletin 75, December issue, 2007*

- SIG 42 2nd workshop on Synthetic Turbulence (Vilanova 29th-30th November 2007) *ERCOFTAC bulletin 77, March issue, 2008* this latter was coupled with a SIG14 event 'ADVANCES IN TURBULENCE IX, PAN-EUROPEAN LABORATORY ON NON-HOMOGENEOUS TURBULENCE' organised by J-M Redondo
- SIG 42 3rd workshop on Synthetic Turbulence (Newcastle 3rd-4th July 2008) *ERCOFTAC bulletin 79, June issue, 2009*
- SIG42 4th Workshop on Synthetic Turbulence Models, Synthetic Turbulence Models and particle laden flows (Nancy, France, 11th-12th December 2008) *ERCOFTAC bulletin 79, June issue, 2009*
- SIG 42 5th Workshop on Synthetic Turbulence Models and Vortex Flow (Warsaw, Poland, 1st-3rd July 2009) *ERCOFTAC bulletin 81, December issue, 2009*
- SIG 42 6th workshop on Synthetic Turbulence Models and Environment (Ecole Centrale de Lyon, 5th-7th July 2010) *submitted to ERCOFTAC bulletin*

The SIG was at the beginning running two small meetings a year as it was thought necessary to bind the group together. Now we have moved to year workshop as it is a more efficient way to use our resources. In particular, it allows us to have more international workshops with speakers and participants from America, North Africa and Asia.

So far the practical objectives of the SIG have remained the same:

- to bound the KS community which indeed has strong European roots, the approach originated in Cambridge (J. C. Hunt) has now spread to many research groups, and attract other international teams (Meneveau (USA), Rosales (Chile)) as well,
- to standardise the codes, perhaps get generic codes that can be used by anyone beyond the KS research community, particularly by industry,
- to advertise the KS technique, for research and industrial applications,
- to have regular meetings and workshops to exchange views on the use of KS,
- to group our assets and combine our effort to apply for European grants.

2 Plan of activities and initiatives in end of 2010 and 2011

The following meetings are scheduled (final dates are still to be decided):

- A SIG 42 steering committee meeting in Paris or Lyon (November-December 2010).
- A workshop at Imperial College, London beginning of September 2011 *title yet to be decided*, co-organised by J. C. Vassilicos and F. Nicolleau (both ERCOFTAC label and scholarships will be requested.)

The first workshops were organised alongside other SIGs, SIG35 as the parent SIG and SIG14 as a the stratified and rotating KS is particularly relevant to its topics. Next workshops are organised where research teams have links with the KS community (e.g. Nancy, Lyon, Glasgow, Imperial, ...) or are developing techniques of interest for KS (e.g. vortex dynamic in Warsaw). They are also crucial for developing the necessary network for European grant applications.

Funding for the organisation of the workshops and to cover travel expenses for the co-ordinator or a leading member of the SIG to attend SPC meetings are needed at this early stage of the SIG development (thanks to last year fundings it was possible to have at least one representative at all SPC meetings in 2010).

3 Agreement with the 'concordat'

We confirm our agreement with the concordat and in particular our commitment to attending SPC meetings.

Code	Title	Location	Dates	Report due	Bulletin	Organisers	Email addresses	Co-organisers	Funding Requested	Funding Decision	Logo Requested	Logo Decision	Reviewed
S2007-01	Small scale turbulence	Cargèse, France.	13/10/2007 - 25/10/2007	25/04/2008	75	Danaila, L.		PCs: France West SIGs: 4, 35	Yes	Yes, 3000	Yes	Yes	Athens, 10.2006
S2007-02	DLES of reacting and two-phase flows	Berlin, Germany.	01/09/2007 - 01/09/2007	01/03/2008	75	Thevenin, D. Tomboulides, A.		SIGs: 28	Yes	Yes, 3000	Yes	Yes	Athens, 10.2006
S2008-01	Int. ss. on turbulence, plankton and marine snow	Vilanova, Spain.	01/09/2008 - 05/09/2008	05/03/2009	79	Clercx, H.	h.j.h.clercx@tue.nl	SIGs: 37 Co: JM Burgers Center, Lille University, Spanish Ministry of Science and Education, CNRS, AGAUR.	Yes	Yes, 3000	Yes	Yes	Athens, 10.2006
S2008-02	Application of PIV	Göttingen, Germany.	25/02/2008 - 29/02/2008	29/08/2008	77	Schröder, A.		PCs: North Germany, Netherlands, France. SIGs: 32	Yes	Yes, 3000	Yes	Yes	Brussels, 10.2007
S2008-03	JM Burgers Centre course on combustion	Eindhoven, Netherlands.	06/05/2008 - 09/05/2008	09/11/2008	79	de Goey, L.P.H. Roekaerts, D.	l.p.h.d.goey@tue.nl dirkr@ws.tn.tudelft.nl	SIGs: 28	Yes	Yes, 3000	Yes	Yes	Brussels, 10.2007
S2008-04	Modern applications of combustion technology	Nürnberg, Germany.	25/02/2008 - 28/02/2008	28/08/2009	-	Dinkelacker, F. Leipertz, A.		SIGs: 28	No	-	Yes	No	Brussels, 10.2007
S2008-05	Modelling of atomisation and sprays	Halle, Germany.	21/07/2008 - 24/07/2008	24/01/2009	79	Sommerfeld, M.	martin.sommerfeld@iw.uni-halle.de	PCs: Germany North SIGs: 12	Yes	Yes, 3000	Yes	Yes	Brussels, 10.2007
S2008-06	Turbulence and mixing in compressible flows II	Marseille, France.	07/07/2008 - 12/07/2008	12/01/2009	79	Dussauge, J-P.	jean-paul.dussauge@polytech.univ-mrs.fr	PCs: France South SIGs: 4	Yes	Yes, 3000	Yes	Yes	Stockholm, 5.2008
S2008-07	LES simulation and application in aeroacoustics	Balatonfüred, Hungary.	31/08/2008 - 06/09/2008	06/03/2009	79	Lajos, T. Lohasz, M.	lajos@ara.bme.hu lohasz@ara.bme.hu	PCs: AHS SIGs: 1, 39 Co: COST ACTION P20 LES-AID, CFD.hu	Yes	Yes, 3000	Yes	Yes	Stockholm, 5.2008
S2009-01	Turbulent mixing and beyond	Trieste, Italy.	01/10/2009	01/04/2010	-	Abarzhi, S.I. Gauthier, S.	snezha@flash.uchicago.edu serge.gauthier@orange.fr	Co: NSF, AFSOR, EOARD, ICTP, ANL, CEA, LANL, DOE ASC, ILE, IIT.	Yes	No	Yes	No	Brussels, 11.2009
S2009-02	Summerschool in Flow Control and Optimization	Stockholm, Sweden.	29/06/2009 - 03/07/2009	03/01/2010	83	Brandt, L. Hanifi, A.	luca@mech.kth.se ardeshir.hanifi@foi.se	SIGs: 33	Yes	Yes, 3000	Yes	Yes	Brussels, 11.2009
S2009-03	Bio-fluid mechanics	Eindhoven, Netherlands.	09/03/2009 - 14/03/2009	14/09/2009	79	van Steenhoven, A.A van de Vosse, F.N. Poelma, C.	a.a.v.steenhoven@tue.nl	PCs: JM Burgers Centre SIGs: 37	Yes	Yes, 3000	Yes	Yes	Brussels, 11.2009
S2010-01	PIV course	Gottingen, Germany	22/03/2010 - 26/03/2010	26/09/2010	-	Schröder, A.	andreas.schroeder@dlr.de	PCs: Germany North, Netherlands, France SIGs: 32 Co: AG Stab, Oldenburg University, Munich University	Yes	No	Yes	Yes	Lausanne, 10, 2009
S2010-02	Non-normality and non-linearity in thermo-acoustics	Munich, Germany	17/05/2010 - 21/05/2010	21/11/2010		Polifke, W. Zellhuber, M. Tomboulides, A.	polifke@td.mw.tum.de zellhuber@td.mw.tum.de ananiast@googlemail.com	SIGs: 28 Co: Marie Curie RTN AETHER	Yes	Yes, 3000	Yes	Yes	Lausanne, 10, 2009
S2010-03	Turbulence and mixing in compressible flows	Oléron Island, France.	13/09/2010 - 18/09/2010	18/03/2011		Comte, P.	Pierre.Comte@lea.univ-poitiers.fr	PCs: France West SIGs: 4, 35	Yes	Yes, 3000	Yes	Yes	Lausanne, 10, 2009
S2010-04	New challenges in turbulence research	Les Houches, France.	21/02/2010 - 26/02/2010	26/08/2010	83	Bourgoin, M. Rousset, B. Pinton, J-F. Cambon, C.	mickael.bourgoin@gmail.com Claude.Cambon@ec-lyon.fr	PCs: France Henri-Bénard SIGs: 4, 35 Co: CNRS	Yes	Yes, 3000	Yes	Yes	Lausanne, 10, 2009
S2010-05	Fundamentals of microscale heat transfer	Lausanne, Switzerland.	07/06/2010 - 11/06/2010	11/12/2010	83	Thome, R.	John.Thome@epfl.ch		Yes	Yes, 3000	Yes	Yes	Delft, 5.2010
S2011-01	Morphology and dynamics of anisotropic flows	Cargèse, France.	18/07/2011 - 30/07/2011	30/01/2012		Danaila, L. Godeferd, F.S. Blor, J.B.	luminita.danaila@coria.fr Fabien.Godeferd@ec-lyon.fr jan-bert.flor@hmg.inpg.fr	PCs: France Henri-Bénard, France-West SIGs: 35 Co: CNRS	Yes		Yes		Lisbon, 10.2010
W2007-01	Quality & reliability of CFD simulations III	Nottingham, UK.	14/03/2007	14/09/2007	73	Lea, C.		PCs: UK SIGs: 5, 101	No	-	Yes	Yes	Florence, 5.2006
W2007-02	Micro PIV and applications in microsystems	Delft, Netherlands.			-	Lindken, R.		SIGs: 32, 38	Yes	Yes	Yes	Yes	Florence, 5.2006
W2007-03	Langrangian techniques in multiphase flow	Trieste, Italy.	05/09/2007 - 07/09/2007	07/03/2008	75	Kuerten, J.			Yes	Yes	Yes	Yes	Athens, 10.2006
W2007-04	Spheric II	Madrid, Spain.	01/05/2007	01/11/2007	73	Gomez-Gesteira, M. Souto Iglesias, A.		SIGs: 40	Yes	Yes	Yes	Yes	Athens, 10.2006
W2007-05	New developments in multipoint turbulence modelling	London, UK.	01/03/2007	01/09/2007	73	Cambon, C.		Co: COST	Yes	Yes	Yes	Yes	Athens, 10.2006

Code	Title	Location	Dates	Report due	Bulletin	Organisers	Email addresses	Co-organisers	Funding Requested	Funding Decision	Logo Requested	Logo Decision	Reviewed
W2007-06	LES simulation for design of combustion systems	Rouen, France.	24/05/2007 - 25/05/2007	25/11/2007	73	Vervisch, L. Tomboulides, A.		Co: EC COST P20, GST	Yes	Yes	Yes	Yes	Athens, 10.2006
W2007-07	IUTAM: Unsteady separated flows and their control	Corfu, Greece.	18/06/2007 - 22/06/2007	22/12/2007	75	Braza, M.		PCs: France South Co: IUTAM	No	-	Yes	Yes	Athens, 10.2006
W2007-08	Laminar-turbulent transition mechanisms	Freudenstadt, Germany.	13/06/2007 - 15/06/2007	15/12/2007	75	Rist, U. Hanifi, A.		SIGs: 33	Yes	Yes	Yes	Yes	Athens, 10.2006
W2007-09	International gas turbine conference	Tokyo, Japan.	02/12/2007 - 07/12/2007	07/06/2008	-	Outa, E. Yoshino, T.		Co: ASME/IGTI. …	No	-	Yes	No	Athens, 10.2006
W2007-10	Workshop on near wall turbulence	Viterbo, Italy.	22/03/2007 - 23/03/2007	23/09/2007	X	Stanislas, M.			No	-	Yes	Yes	Athens, 10.2006
W2007-11	Synthetic turbulence models	Sheffield, UK.	29/05/2007 - 30/05/2007	30/11/2007	75	Nicolleau, F.		PCs: France Henri Bénard, UK. SIGs: 1, 35	Yes	Yes	Yes	Yes	Berlin, 5.2007
W2007-12	Quality & reliability of LES	Leuven, Belgium.	24/10/2007 - 26/10/2007	26/04/2008	75	Meyers, J. Geurts, B.J. Sagaut, P.		SIGs: 1	Yes	Yes	Yes	Yes	Berlin, 5.2007
W2007-13	PAN-EUROPEAN lab on non-homogeneous turbulence	Vilanova, Spain.	29/11/2007 - 01/12/2007	01/06/2008	77	Redondo, J.M.		PCs: Iberian East, France Henri Bénard SIGs: 14, 35	Yes	Yes	Yes	Yes	Brussels, 10.2007
W2007-14	LES for combustion and transition modelling	Ghent, Belgium.	29/11/2007 - 30/11/2007	30/05/2008	79	Dick, E. Elsner, W.	erik.dick@ugent.be	SIGs: 10, 28	No	-	Yes	Yes	Brussels, 10.2007
W2008-01	ETMM7	Limassol, Cyprus.	04/06/2008 - 06/06/2008	06/12/2008	-	Leschziner, M.A. Kassinos, S.	mike.leschziner@imperial.ac.uk	Co: University of Cyprus	Yes	-	Yes	-	Florence, 5.2006
W2008-02	Spheric III	Lausanne, Switzerland.	04/06/2008 - 06/06/2008	06/12/2008	77	Maruzewski, P.	pierre.maruzewski@epfl.ch	SIGs: 1	Yes	Yes, 2000	Yes	Yes	Brussels, 10.2007
W2008-03	Sound source mechanisms in turbulent shear flows	Poitiers, France.	07/07/2008 - 09/07/2008	09/07/2008	83	Jordan, P.	peter.jordan@lea.univ-poitiers.fr	PCs: France West	No	-	Yes	Yes	Brussels, 10.2007
W2008-04	DNS and LES of reacting flows	Eindhoven, Netherlands.	22/10/2008 - 24/10/2008	24/04/2009	X	de Goey, L.P.H.	l.p.h.d.goey@tue.nl	SIGs: 28 EC COST P20	Yes	No	Yes	Yes	Brussels, 10.2007
W2008-05	Quality & reliability of CFD simulations IV	Nottingham, UK.	05/03/2008	05/09/2008	79	Lea, C.	chris.leabuxton@btinternet.com	PCs: UK SIGs: 5, 101 Co: NAFEMS	Yes	Yes, 2000	Yes	Yes	Brussels, 10.2007
W2008-06	SIG33: Open issues in transition and flow control	Genova, Italy.	16/10/2008 - 18/10/2008	18/04/2009	79	Bottaro, A. Hanifi, A.	alessandro.bottaro@unige.it ardeshir.hanifi@foi.se	SIGs: 33	Yes	Yes, 2000	Yes	Yes	Brussels, 10.2007
W2008-07	European drag reduction and flow control meeting	Mariental, Germany.	08/09/2008 - 11/09/2008	11/03/2009	77	Hage, W. Wassen, E.	kwing-so.choi@nottingham.ac.uk wolfram.hage@dlr.de erik.wassen@cfd.tu-berlin.de	SIGs: 20	Yes	Yes, 2000	Yes	Yes	Stockholm, 5.2008
W2008-08	DLES 7	Trieste, Italy.	08/09/2008 - 10/09/2008	10/03/2009	77	Armenio, V. Fröhlich, J. Geurts, B.J. …	armenio@dica.units.it froehlich@ict.uni-karlsruhe.de b.j.geurts@math.utwente.nl	SIGs: 1	Yes	Yes*, 2000	Yes	Yes	Stockholm, 5.2008
W2008-09	Multiscale methods for fluid and plasma turbulence	Luminy, France.	21/04/2008 - 25/04/2008	25/10/2008	-	Schneider, K.	kschneid@cmi.univ-mrs.fr	PCs: France Henri Bénard SIGs: 35 Co: CNRS, CEA, ONR, Franco-Allemande Uni	Yes	No	Yes	No	Stockholm, 5.2008
W2008-10	13th. Workshop on turbulence modelling	Graz, Austria.	25/09/2008 - 26/09/2008	26/03/2009	79	Brenn, G. Jakirlic, S.	brenn@fluidmech.tu-graz.ac.at s.jakirlic@sla.tu-darmstadt.de	PCs: AHS SIGs: 15 Co: IAHR, COST	Yes	Yes, 2000	Yes	Yes	Stockholm, 5.2008
W2008-11	4th Workshop on synthetic turbulence modelling	Nancy, France.	11/12/2008 - 12/12/2008	12/06/2009	79	Angilella, J.R. Nicolleau, F.	jean-regis.angilella@ensem.inpl-nancy.fr f.nicolleau@sheffield.ac.uk	SIGs: 35, 42 PCs: France Henri Bénard	Yes	Yes*, 2000	Yes	Yes	Brussels, 11.2008
W2008-12	3rd. Workshop on synthetic turbulence models	Newcastle, UK.	03/07/2008 - 04/07/2008	04/01/2009	79	Nicolleau, F. Reeks, F. Baggaley, C. Cambon, C.	f.nicolleau@sheffield.ac.uk mike.reeks@newcastle.ac.uk a.w.baggaley@newcastle.ac.uk claude.cambon@ec-lyon.fr	PCs: France Henri Bénard, UK. SIGs: 35, 42	Yes	Yes, 2000	Yes	Yes	Stockholm, 5.2008
W2009-01	Conference on turbulence and interactions	Martinique, France.	31/05/2009 - 05/06/2009	05/12/2009	83	Deville, M.	michel.deville@epfl.ch	PCs: France Henri Bénard, Swiss SIGs: 4, 12, 14, 35, 39, 42 Co: EPFL, DGA, ONERA, UPMC	No	-	Yes	Yes	Stockholm, 5.2008

Code	Title	Location	Dates	Report due	Bulletin	Organisers	Email addresses	Co-organisers	Funding Requested	Funding Decision	Logo Requested	Logo Decision	Reviewed
W2009-02	Immersed boundary methods	Amsterdam, Netherlands.	01/06/2009	01/12/2009	83	Pourquie, J. Breugem, W-P. Boersma, B.J. Turek, S.	m.j.b.m.pourquie@tudelft.nl	PCs: JM Burgers Centre Co: EUROMECH, Royal Dutch Academy of Sci.	Yes	No	Yes	Yes	Brussels, 11.2008
W2009-03	Quality & Reliability of LES II	Pisa, Italy.	09/09/2009 - 11/09/2009	11/03/2010	81	Salvetti, M.	mv.salvetti@ing.unipi.it	SIGs: 1 Co: University of Pisa, COST Action P20 LES-AID	Yes	Yes*, 2000	Yes	Yes	Brussels, 11.2008
W2009-04	Fluxes and structures in fluids	Moscow, Russia.	24/06/2009 - 27/06/2009	27/12/2009		Chashechkin, Y.D. Baydulov, V.G.	chakin@ipmnet.ru bayd@ipmnet.ru	Sigs: 14, 42 Co: RAS	Yes	Yes*, 2000	Yes	Yes	Brussels, 11.2008
W2009-05	Papermaking research symposium *Withdrawn*	-	-	-	81	-			-	-	-	-	-
W2009-07	LES of Turbulence, Acoustics and Combustion	Marseilles, France.	24/08/2009 - 28/08/2009	28/02/2010	83	Comte, P. Serre, E.	pierre.comte@lea.univ-poitiers.fr eric.serre@L3m.univ-mrs.fr	PCs: France-West SIGs: 1	No	-	Yes	Yes	Brussels, 11.2008
W2009-08	Quality & Reliability in Aerospace CFD	Nottingham, UK.	04/03/2009	04/09/2009	-	Parry, J.	john_parry@mentor.com	PCs: UK SIGs: 5, 101 Co: NAFEMS	No	-	Yes	No	Brussels, 11.2008
W2009-09	Turbulent Spray Combustion	Corsica, France.	07/06/2009	07/12/2009	81	Merci, B. Roekaerts, D.	bart.merci@ugent.be d.j.e.m.roekaerts@tudelft.n	SIGs: 28	Yes	Yes, 2000	Yes	Yes	Brussels, 11.2008
W2009-10	3rd Hybrid RANS-LES Symposium	Gdansk, Poland.	10/06/2009 - 12/06/2009	12/12/2009	83	Doerffer, P. Haase, W. Peng, S-H.	doerffer@karol.imp.gda.pl office@haa.se peng@foi.se	Co: EADS, FOI, IMP-PAN	No	-	Yes	Yes	Brussels, 11.2008
W2009-11	Research in turbulence and transition	Lisbon, Portugal.	16/10/2009	16/04/2010	83	Theofilis, V. Castilla, R. da Silva, C.	vassilios.theofilis@upm.es castilla@mf.upc.edu carlos.silva@ist.utl.pt	PCs: Iberian West, Iberian East SIGs: 1, 4, 14, 15, 33 Co: IST, IDMEC	Yes	Yes, 2000	Yes	Yes	Lausanne, 10, 2009
W2009-12	Turbulent flows	Ecully, France.	04/12/2009 - 05/12/2009	05/06/2010	83	Naso, A. Nicolleau, F. Godeferd, F. Cambon, C.	aurore.naso@ens-lyon.fr f.nicolleau@sheffield.ac.uk Claude.Cambon@ec-lyon.fr	PCs: France Henri Bénard SIGs: 35 Co: CNRS, CBP	Yes	Yes, 2000	Yes	Yes	Lausanne, 10, 2009
W2009-13	Synthetic turbulence and vortex flows	Warsaw, Poland.	01/07/2009 - 03/07/2009	03/01/2010	81	Nowakowski, A.	a.f.nowakowski@sheffield.ac.uk	PCs: Polish SIGs: 42, 35	Yes	Yes, 2000	Yes	Yes	Budapest, 5.2009
W2009-14	14th Worshop on turbulence modelling	Rome, Italy.	18/09/2009	18/03/2010		Jakirlic, S. Rispoli, F. Borello, D.	s.jakirlic@sla.tu-darmstadt.de rispoli@dma.ing.uniroma1.it borello@dma.ing.uniroma1.i	PCs: Italy SIGs: 15 Co: IAHR, COST	Yes	Yes, 2000	Yes	Yes	Budapest, 5.2009
W2009-15	Global flow instability and control	Crete, Greece.	28/09/2009 - 30/09/2009	30/03/2010	83	Theofilis, V.	vassilios.theofilis@upm.es	PCs: Iberian West SIGs: 33 Co: US AFOSR/EOARD, Caltech, Ecole Polytechnique Paris	Yes	Yes, 2000	Yes	Yes	Budapest, 5.2009
W2010-01	Workshop on fibre suspension flows	Stockholm, Sweden.	09/02/2010 - 10/02/2010	10/08/2010	83	Lundell, F.	fredrik@mech.kth.se	SIGs: 43	No	-	Yes	Yes	Lausanne, 10, 2009
W2010-02	MUSAF colloquium	Toulouse, France.	27/09/2010 - 29/09/2010	29/03/2011		Gicquel, L. Gourdain, N. Boussuge, J-F. Poinsot, T.	lgicquel@cerfacs.fr gourdain@cerfacs.fr boussuge@cerfacs.fr poinsot@cerfacs.fr	SIGs: 1, 5, 14, 15, 28, 36, 37, 41, 101 Co: Airbus, Safran, Onera, EU(FP7)	No	-	Yes	Yes	Lausanne, 10, 2009
W2010-03	European drag reduction and flow control meeting	Kiev, Ukraine.	06/09/2010 - 09/09/2010	09/03/2011		Voropayev, G. Choi, K-S.	vortex@nbi.com.ua Kwing-so.Choi@nottingham.ac.uk	SIGs: 20 Co: Ukrainain Academy of Sciences	Yes	Yes, 2000	Yes	Yes	Lausanne, 10, 2009
W2010-04	Advances and applications of GiD	Ibiza, Spain.	25/05/2010 - 27/05/2010	27/11/2010	-	Coll, A. Castilla, R.	abelcs@cimne.upc.edu castilla@mf.upc.edu	PCs: Iberian East Co: COMPASSIS, Technical University of Catalonia	Yes	No	Yes	No	Lausanne, 10, 2009
W2010-05	Two-phase flow predictions	Halle, Germany.	22/03/2010 - 26/03/2010	26/09/2010	Rec.	Sommerfeld, M.	martin.sommerfeld@iw.uni-halle.de	PCs: Germany North SIGs: 12	Yes	Yes, 2000	Yes	Yes	Lausanne, 10, 2009
W2010-06	Dynamics of non-spherical particles in fluid turbulence	Trondheim, Norway.	29/09/2010 - 01/10/2010	01/04/2011		Andersson, H. Soldati, A.	helge.i.andersson@ntnu.no soldati@uniud.it	PCs: Nordic SIGS: 43, 12	Yes	Yes, 2000	Yes	Yes	Lausanne, 10, 2009
W2010-07	DLES 8	Eindhoven, Netherlands.	07/07/2010 - 09/07/2010	09/01/2011	Rec.	Kuerten, J.	j.g.m.kuerten@tue.nl	SIGs: 1	Yes	Yes, 2000	Yes	Yes	Budapest, 5.2009
W2010-08	Mixing and dispersion in flows dominated by rotation and buoyancy	Limburg, Netherlands.	20/06/2010 - 23/06/2010	23/12/2010		Clercx, H.	h.j.h.clercx@tue.nl	PCs: JM Burgers SIGs: 12, 14 Co: TU Einhoven, FOM, NOW	Yes	Yes, 2000	Yes	Yes	Delft, 5.2010
W2010-09	Global instabilities of open flows	Nice, France.	30/06/2010 - 02/07/2010	02/01/2011		Chomaz, J-M. Gallaire, F. Hanifi, A.	jean-marc.chomaz@ladhyx.polytechnique.fr francois.gallaire@unice.fr ardeshir.hanifi@foi.se	SIGs: 33	Yes	Yes, 2000	Yes	Yes	Delft, 5.2010

Code	Title	Location	Dates	Report due	Bulletin	Organisers	Email addresses	Co-organisers	Funding Requested	Funding Decision	Logo Requested	Logo Decision	Reviewed
W2010-10	Radiation of high temperature gases in atmospheric entry	Lausanne, Switzerland.	12/10/2010 - 15/10/2010	15/04/2011		Leyland, P. Sobbia, R.	penelope.leyland@epfl.ch raffaello.sobbia@epfl.ch	PCs: LEC Switzerland Co: ESA, CNES	Yes	Yes, 2000	Yes	Yes	Delft, 5.2010
W2010-11	6th Workshop on synthetic turbulence models	Lyon, France.	05/07/2010 - 07/07/2010	07/01/2011	Rec.	Nicolleau, F. Godeferd, F.	F.Nicolleau@Sheffield.ac.uk Fabien.Godeferd@ec-lyon.fr	PCs: France Henri Bénard, UK SIGs: 14, 42	Yes	Yes, 2000	Yes	Yes	Delft, 5.2010
W2010-12	5th Workshop on research in turbulence and transition	Tarragona, Spain.	29/10/2010	29/04/2011		Vernet, A. Castilla, R.	anton.vernet@urv.cat castilla@mf.upc.edu	PCs: Iberian East, Iberian West Co: CIMNE	Yes	Yes, 2000	Yes	Yes	Delft, 5.2010
W2010-13	Instabilities turbulence and interactions in rotating shear flows	Luminy, France.	04/10/2010 - 09/10/2010	04/01/2011		Cambon, C. Schneider, K.	Claude.Cambon@ec-lyon.fr kschneid@cmi.univ-mrs.fr	SIGs. 35 PCs: France Henri Bénard, France West	Yes	Yes, 2000	Yes	Yes	Delft, 5.2010
W2011-01	Cardiovascular fluid mechanics	Cagliari, Italy.	01/06/2011	01/12/2011		Querzoli, G. Pedrizzetti, G.	querzoli@unica.it giannip@dica.units.it	SIGs: 37 Co: EUORMECH	Yes	Yes, 2000	Yes	Yes	Delft, 5.2010
W2011-02	3rd Workshop on fibre suspension flows	Nancy, France.	06/04/2011 - 07/04/2011	07/10/2011		Skali-Lami, S. Hamalainen, J.	Salaheddine.Skali-Lami@ensem.inpl-nancy.fr jari.hamalainen@uef.fi	SIGs: 43 Co: CTP-Grenoble	No	-	Yes	Yes	Delft, 5.2010
W2011-03	2nd Workshop on turbulent spray combustion	Italy?	01/07/2011	01/01/2012		Merci, B. Roekaerts, D. Sadiki, A. Tomboulides, A.	bart.merci@ugent.be d.j.e.m.roekaerts@tudelft.nl sadiki@ekt.tu-darmstadt.de ananiast@googlemail.com	SIGs: 28 Co: Belgian section of Combustion Institute	Yes	Yes, 2000	Yes	Yes	Delft, 5.2010
W2011-04	Diagnostics for turbulent combustion	Rouen, France.	25/05/2011 - 26/05/2011	26/11/2011		Domingo, P. Moureau, V. Tomboulides, A.	domingo@coria.fr moureau@coria.fr ananiast@googlemail.com	SIGs: 28 Co: University and INSA Rouen	Yes	Yes, 2000	Yes	Yes	Delft, 5.2010
W2011-05	Workshop on Turbulence Modelling	Chatou, France.	01/10/2011	01/01/2012		Jakirlic, S. Benhamadouche, S. Manceau, R.	s.jakirlic@sla.tu-darmstadt.de sofiane.benhamadouche@edf.fr remi.manceau@lea.univ-poitiers.fr	SIGs: 15 PCs: France West Co: IAHR, COST	Yes		Yes		Lisbon, 10.2010
W2011-06	Simulation of Multiphase Flows in Gasification and Combustion	Dresden, Germany.	01/09/2011	01/03/2012		Tomboulides, A. Hasse, C. Thévenin, D. Vervisch, L.	ananiast@googlemail.com Christian.Hasse@iec.tu-freiberg.de thevenin@ovgu.de vervisch@coria.fr	SIGs: 28	Yes		Yes		Lisbon, 10.2010
W2011-07	Progress in Transition Modeling and Control	Toledo, Spain.	28/09/2011 - 30/09/2001	30/03/2012		Theofilis, V. Hanifi, A.	vassilios.theofilis@upm.es ardeshir.hanifi@foi.se	SIGs: 33	Yes		Yes		Lisbon, 10.2010
W2011-08	Young ERCOFTAC workshop	Montestigliano, Italy.	27/03/2011 - 02/04/2011	02/07/2011		Schmid, P.	peter@ladhyx.polytechnique.fr	PCs: Germany South	Yes		Yes		Lisbon, 10.2010
W2011-09	Statistical mechanics in fluids and superfluids	Paris, France.	13/04/2011 - 15/04/2011	15/10/2011		Cambon, C.	Claude.Cambon@ec-lyon.fr	PCs: France Henri-Bénard SIGs: 14, 35 Co: CNRS, CEA	Yes		Yes		Lisbon, 10.2010

ERCOFTAC Workshops and Summer Schools

1. Applications for ERCOFTAC event sponsorship

To be considered at the SPC meeting in Lisbon on the 12th October 2010.

	Workshops and Summer Schools	**Scholarships**
W2011-05	Workshop on Turbulence Modelling	X
W2011-06	Simulation of Multiphase Flows in Gasification and Combustion	X
W2011-07	Global Instabilities of Open Flows	X
W2011-08	Young ERCOFTAC workshop	X
W2011-09	Statistical mechanics in fluids and superfluids	X
S2011-01	Morphology and dynamics of anisotropic flows	X

2. Funding status after the SPC meeting held in Delft on the 18th May 2010

2008	8WS + 6SS	= 34k Euros
2009	8WS + 2SS	= 22k Euros
2010	10WS + 4SS	= 32k Euros
2011	3WS + 0SS	= 6k Euros

Annual funding limit: 25k Euros

2. Overdue reports – plus 6 months from 12th October 2010

			Scholarships
W2009-04	Fluxes and structures in fluids	24.6.2009	Cancelled
W2009-14	14th Workshop on turbulence modelling	18.9.2009	Cancelled

European Research Community On Flow, Turbulence And Combustion

WORKSHOPS/CONFERENCES/SUMMERSCHOOLS/COURSES SUMMARY SHEET

Title	***15th ERCOFTAC (SIG15) Workshop on Turbulence Modelling*** *Add a brief summary of the objectives of the activity (or the announcement) on a separate page*
	X Workshop Summerschool Conference Course
Location and Date	***October, 2011, Électricité de France - EDF, Chatou, France***
Organizer	**Name: Dr. Sofiane Benhamadouche / Dr. Remi Manceau**
	Address: ***Électricité de France - EDF, Département Mécanique des Fluides Energies et Envoronnement, 6 Quai Watier, 78401 Chatou, France***
	Country: France
	Tel.: 0033 (1) 30 87 79 86 Fax: 0033 (1) 30 87 79 16
	E-mail: sofiane.benhamadouche@edf.fr / manceau@lea.univ-poitiers.fr
Pilot Center(s) or SIGs involved	**SIG15 and PC France West (Prof. J.P. Bonnet, LEA University of Poitiers)**
Co-organizing Associations	**IAHR and COST**
Scholarships	**request scholarships ?** **X** Yes No
Rules	**I have read the document "Rules for holding ERCOFTAC event", which can be found on www.ercoftac.org, ERCOFTAC events: X** Yes No

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Number	W2011-05

Date Received	8.9.2010
Discussed SPC & MB	**SPC** **MB**
Scholarships	Yes, Amount EURO No
Announcement	Bulletin
Report	Bulletin

15th ERCOFTAC (SIG15) Workshop on Turbulence Modelling
October, 2011, Électricité de France, Chatou, France

Objectives: Keeping in mind the wide use of CFD technology for solving the problems of industrial relevance, questions about the credibility and reliability of both the numerical methods and mathematical models simulating turbulence can only be tackled by intensive verification and systematic validation. The role of the ERCOFTAC series of workshops on refined turbulence modelling is closely connected to that. The workshops aim at bringing together scientists, researchers, users and developers from industry and from the academic field. A large data-base of simulation results assembled in such a way, as well as their detailed comparison with the reliable reference data obtained experimentally, by means of DNS but also by highly-resolved LES, enable discussion and conclusions about predictive performances of variety of turbulence models in a broad range of well-documented flow configurations. Until now SIG15 have organized fourteen workshops in Lyon (1991), Manchester (1993), Lisbon (1994), Karlsruhe (1995), Chatou (1996), Delft (1997), Manchester (1998), Helsinki (1999), Darmstadt (2001), Poitiers (2002), Gothenburg (2005), Berlin (2006), Graz (2008) and Rome (2009). The workshop in Chatou will be a two-day workshop dealing with the back-report on the previous workshop (concentrating mostly with on 3D diffuser case). The test cases to be computed will be soon determined. The discussion about them is in progress. Possibly, one or two survey lectures dealing with the cases in question and state-of-the-art of the computational methods will be organized.

Steering committee (SIG15): K. Hanjalic, TU Delft and Universita di Roma “La Sapienza”; S. Jakirlic (coordinator), Technical University Darmstadt; D. Laurence, University of Manchester and EDF, France; B. Launder, University of Manchester; W. Rodi, University of Karlsruhe; M. Leschziner, Imperial College of Science, London; F. Menter, ANSYS Germany; R. Manceau, University of Poitiers; D. von Terzi, University of Karlsruhe; S. Wallin, KTH Stockholm and FOI

Local organizing committee: Dr. Sofiane Benhamadouche, EDF and Dr. Remi Manceau, LEA, University of Poitiers (SIG15 steering committee member)

European Research Community On Flow, Turbulence And Combustion

WORKSHOPS/CONFERENCES/SUMMERSCHOOLS/COURSES SUMMARY SHEET

Title	"Simulation of Multiphase Flows in Gasification and Combustion " MFGC-1 (Please see brief summary in the next page) *Add a brief summary of the objectives of the activity (or the announcement) on a separate page*
	□ Workshop □ Summerschool ■Conference □ Course
Location and Date	Dresden, Germany, September 2011
Organizer	**Name:** Prof. C. Hasse (University of Technology Freiberg) Prof. D. Thévenin (Univ. of Magdeburg) Prof. L. Vervisch (CORIA CNRS & INSA ROUEN)
	Address: Department of Energy Process Engineering, Reiche Zeche, Fuchsmuehlenweg 9, Haus, 1, 09599 Freiberg
	Country: Germany
	Tel +49 3731 39 4820 **Fax:** +49 2731 39 4555
	E-mail: Christian.Hasse@iec.tu-freiberg.de, thevenin@ovgu.de, vervisch@coria.fr
Pilot Center(s) or SIGs involved	SIG28 Reacting Flows
Co-organizing Associations	
Scholarships	**request scholarships ?** ■ Yes (if possible) □ No
Rules	**I have read the document "Rules for holding ERCOFTAC event", which can be found on www.ercoftac.org, ERCOFTAC events:** ■ Yes □ No

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Number	W2011-06

Date Received	20.9.2010	
Discussed SPC & MB	**SPC**	**MB**
Scholarships	□ Yes, Amount EURO	□ No
Announcement	Bulletin	
Report	Bulletin	

Brief Summary of the objectives of the activity

Simulation of Multiphase Flows in Gasification and Combustion
MFGC-1

Dresden, Germany, September, 2011

The objective of this ERCOFTAC conference is to bring together experts and scientists in the field of advanced modelling and simulation of multiphase flows in both combustion and gasification. Multiphase can stand for any combination of gas, liquid and solid matter.
In addition to the continuously high interest in combustion in multi-phase flows, e.g. in engines, gas turbines or coal combustors for mobility and power generation, gasification for both energetic and non-energetic use (polygeneration) has recently gained significant interest.
Both combustion and gasification are multi-scale problems with subprocesses such as complex gas-phase kinetics, highly turbulent flows, turbulence-chemistry interaction, evaporation and break-up of liquid fuels, heterogeneous reactions for solid fuels, dense particle systems etc.; differences are e.g. the global process fuel/air equivalence ratio and the final targeted products. Despite the significant overlap of physical processes, there has been only little interaction between the research areas and only recently has gasification gained more interest in the combustion community.
This meeting will bring together researchers from both fields to discuss state-of-art modelling approaches and simulation results. It is meant to highlight possibilities of common approaches and aims at establishing a closer collaboration between both fields.

Invited lectures by experts in the field of combustion and gasification are planned and participants will have the opportunity to present their work in contributed oral or poster presentations. These presentations will promote discussions between researchers. Depending on the quality of papers a special issue of Flow, Turbulence and Combustion may be planned after discussion with the Editorial board of the journal.

Participants will pay a modest registration fee. *The ERCOFTAC contribution could be used towards reducing the registration fee for ERCOFTAC members as well as to allow free participation for a number of young researchers.* Other expenses of the conference include conference room rental, travel expenses of the invited lecturers, lunch and coffee breaks.

Conference Chairs:
Prof. Christian Hasse (University of Technology Freiberg)
Prof. Dominique Thévenin (University of Magdeburg “Otto von Guericke")
Prof. Luc Vervisch (CORIA CNRS & INSA ROUEN)

Selected topics:

- LES and (U)RANS calculations of multiphase flows
- Heterogeneous reaction modelling for solid feedstock
- Feedstock characterization
- Mineral matter reactions (ash/slag)
- Calculation of complex thermodynamic equilibria for multi-phase systems
- Gas-phase chemistry for complex fuels and primary reference fuels
- Reduced chemical mechanisms for application in CFD simulations
- Modelling of spray break-up, (multi-component) evaporation and spray flames
- Dense particle systems

European Research Community On Flow, Turbulence And Combustion

WORKSHOPS/CONFERENCES/SUMMERSCHOOLS/COURSES SUMMARY SHEET

Title	**9th ERCOFTAC SIG33 workshop** **Progress in Transition Modeling and Control** *Add a brief summary of the objectives of the activity (or the announcement) on a separate page*
	✕ **Workshop** ❒ Summerschool ❒ Conference ❒ Course
Location and Date	Toledo, Spain Sept. 28-30, 2011
Organizer	**Name:** Vassilios Theofilis (Chair.), Ardeshir Hanifi
	Address: Vassillios Theofilis School of Aeronautics, Universidad Politécnica de Madrid Plaza Cardenal Cisneros 3, E-28040 Madrid
	Country: Spain
	Tel.: +34 91 336 3298 **Fax:** +34 91 336 3295
	E-mail: vassilis@aero.upm.es
Pilot Center(s) or SIGs involved	SIG 33
Co-organizing Associations	
Scholarships	**Request scholarships?** ✕ **Yes** ❒ No
Rules	**I have read the document "Rules for holding ERCOFTAC event", which can be found on www.ercoftac.org, ERCOFTAC events:** ✕ **Yes** ❒ No

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Switzerland

To be filled-in by ERCOFTAC

Number	W2011-07

Date Received	24.9.2010
Discussed SPC & MB	**SPC** **MB**
Scholarships	❒ Yes, Amount EURO ❒ No
Announcement	Bulletin
Report	Bulletin

ERCOFTAC
European Research Community
On Flow, Turbulence And Combustion

9th ERCOFTAC SIG 33 Workshop

Progress in Transition Modeling and Control

Toledo, Spain, Sept. 28-30, 2011

Scope:

The 9th SIG 33-ERCOFTAC Workshop belongs to the successful series initiated in 1999 in Toulouse with the workshop on "Adjoint methods in flow control, optimization, weather predictions, etc."

The purpose of the present workshop is to provide a forum where new ideas and concepts on global modes and flow control can be openly discussed. Each session will be initiated by an introduction by a leading expert pointing out promising directions of future research efforts, and will be closed by a round-table discussion chaired by the same expert.

Invited speakers: (to be confirmed)

- *Bernd Noak (Univ. Poitiers)*
- *Jeffery Crouch (Boeing)*
- *Alessandro Bottaro (Univ. Genova)*
- *Luca Brandt (KTH)*

Topics:

We invite submission of abstracts on ongoing activities on:

- Linear stability approaches, modal and non-modal theories, etc.
- Effect of stochastic and deterministic excitations, receptivity, etc.
- By-pass transition, experiments and scaling laws, etc.
- Nonlinear effects, "exact coherent structures", edge states, etc.
- Control, estimation and compensation, etc.
- Optimal and suboptimal control, experimental approaches, etc.
- Reduced order models, etc.

Scholarships:

A limited number of scholarships may be made available by ERCOFTAC (to be confirmed).

Location:

Parador Nacional de Toledo, Toledo, Spain (to be confirmed).
Web site: http://www.paradores-spain.com/spain/ptoledo.html

Abstract deadline:

March 31, 2011. Abstracts are to be submitted from the following web site: http://www2.mech.kth.se/sig33/

Organizers:

Vassilios Theofilis (UPM, Spain)
Ardeshir Hanifi (FOI / KTH, Sweden)

Contact:

Vassillios Theofilis
School of Aeronautics, Universidad Politécnica de Madrid
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European Research Community On Flow, Turbulence And Combustion

WORKSHOP – CONFERENCE – SUMMER SCHOOL - COURSE
APPLICATION SHEET

Title	YOUNG ERCOFTAC: Special Topics in Fluid Dynamics for doctoral and postdoctoral students *Add a brief summary of the objectives of the activity (or the announcement) on a separate page*
	[x] Workshop [ ] Summer School [ ] Conference [ ] Course
Location and Date	Montestigliano, Italy 27.3.2011 – 2.4.2011 (tentative)
Organizer	**Name** Peter Schmid
	Address Laboratoire d'Hydrodynamique (LadHyX), CNRS-Ecole Polytechnique, F-91128 Palaiseau, France
	Country France
	Tel +33 1 69 33 52 85 **Fax** +33 1 69 33 52 92
	Email peter@ladhyx.polytechnique.fr
Pilot Center(s) or SIGs involved	Pilot Center Germany South
Co-organizing Associations	none
Scholarships	**Scholarship request?** [x] Yes [ ] No
Rules	**I have read the document "Rules for holding ERCOFTAC events", which can be found on www.ercoftac.org** [x] Yes [ ] No

Please return this form, and its annexes, by email or fax to:

ERCOFTAC Coordination Centre, EPFL, Switzerland.
Email: ercoftac@epfl.ch
Fax: +41 21 693 5960

To be completed by ERCOFTAC | **Number** | W2011-08 |

Date Received	24.9.2010	
Approval	**SPC**	**MB**
Scholarships	[ ] Yes, Amount EURO	[ ] No
Announcement	Bulletin	
Report	Bulletin	

Proposal to ERCOFTAC

YOUNG ERCOFTAC: A Workshop Series on Special Topics in Fluid Dynamics for doctoral and postdoctoral students

Peter Schmid
Laboratoire d'Hydrodynamique (LadHyX)
École Polytechnique, 91128 Palaiseau, France

Under the auspices of ERCOFTAC, a series of workshops on current and advanced topics in fluid dynamics for a select group of doctoral and postdoctoral students is proposed. These workshops will be directed by a keynote speaker (with the help of an organizing committee) and feature project-based team work of all participants. This proposal is in continuation of previous YOUNG ERCOFTAC workshops held in 2007 and 2008.

The majority of technological advances in fluid mechanics take place at the periphery of the field where classical knowledge and understanding meet with new application areas and new tools. Progress on this interface requires the expertise not only in accustomed concepts, but also familiarity with new disciplines, with modern techniques and, above all, with a fresh point of view. As a result, besides a sound grounding in the traditional concepts of fluid dynamics, knowledge of physical concepts (atmospheric sciences, combustion physics, energy conversion technology, biomimetic ideas, etc.) as well as mathematical and computational issues (fast algorithms, data mining techniques, image-based methods, etc.) become increasingly pivotal. Unfortunately, the education and training of young scientists does seldom account for this multi-disciplinary approach: university courses succeed in laying a foundation in rudimentary (and even a few specialized) concepts; conferences and minisymposia expose young scientists to key concepts and recent advances, but the material is often presented at too advanced a level; workshops cover special topics, but frequently require only a passive involvement of the participants. The proposed workshop series aims at addressing the need for a multidisciplinary approach and exposure to modern topics of fluid dynamics of current interest, coupled with an active involvement of the participants in the selected topic by project-based work and a team-based environment. It should give participants a quick and effective entry-point into a topic of current concern or into a technique of wide-ranging potential.

Format. The workshops will take place in the spring (end of March) of each year at the Tuscan farmhouse of Montestigliano, located 15 km South of Siena, and will involve 12-15 pre- and post-doctoral students from European universities. One principal speaker will give a pedagogical introduction to the chosen topic and lay out key issues and concepts for the participants. In close collaboration with the organizers (see below) the principal speaker will design and supervise work

on didactic projects that will introduce the students to current problems and current techniques. This format has been tested during similar workshops under the auspices of ERCOFTAC (2007 on Flow Control and 2008 on Model Reduction) and in 2010 (on Low- Dimensional Models for Flow Optimization and Flow Manipulation) under the sponsorship of LadHyX/Ecole Polytechnique and the Linné FLOW Centre/KTH. The workshops have received very positive feedback from participants.

Goal. Goal of the workshop is the efficient and targeted introduction of interested students into a specific area of fluid dynamics under the guidance of an acknowledged expert and by working out solutions to specific problems within the chosen topic. Within a larger picture, the workshop series is intended to become an important element in the training of young scientists in a specialized field of current interest. The location should become as defining as its sponsorship.

Output. Tangible output from the workshop will be a detailed report containing a tutorial (by the principal speaker) as well as a collection of the worked-out student projects which will be edited, assembled and distributed by the organizing committee. The archived collection of the projects in modular form can serve as a basis for a more substantial set of research vignettes which can help interested students to gain quick access to special topics and teachers to augment their lectures by stimulating classroom material.

Organization. The organization of the workshops will be in the hands of a committee consisting of Peter Schmid (LadHyX, chair), François Gallaire (EPFL Lausanne), Shervin Bagheri (KTH Stockholm) and Fulvio Martinelli (LadHyX).

Estimated budget and cost breakdown. Support for the workshop series, covering accommodation, travel of the invited principal speaker and various other expenses, will be requested from ERCOFTAC. Cost estimates, based on previous workshops at the same location, come to approximately 4500 Euros for the week-long workshop. This amount includes the weekly rental fees for the main house (2000 Euros) and accommodations (950 Euros), the travel costs for the main speaker (500 Euros), local transportation (500 Euros) and expenses for one social event (500 Euros). The individual travel costs to Montestigliano have to be carried by the home institute of the participants (including the organizers). In addition, following the tradition of previous workshops, money for food (approximmately 12 Euros/day for three meals) will be collected from all participants. For each workshop, an estimate of the costs will be submitted for approval together with a description of the topic and the modalities of the workshop; after the conclusion of the workshop, a list of expenses will also be submitted.

Specific details for the 2011 workshop. A workshop on "Nonlinear steady state solutions and their role in transition and turbulence" will be conducted. This subject currently enjoys great interest (both theoretically and experimentally) in the fluid dynamics community; the output of scientific articles, mini-symposia and invited conference presentations attest to this fact. Prof. Richard Kerswell (U Bristol), an acknowledged expert in this field, will be the key speaker at the workshop and guide the students into the subject area.

European Research Community On Flow, Turbulence And Combustion

WORKSHOPS/CONFERENCES/SUMMERSCHOOLS/COURSES
SUMMARY SHEET

Title	SIG 35 workshop on statistical mechanics, fractals, instabilities and turbulence, in fluids and superfluids. *Add a brief summary of the objectives of the activity (or the announcement) on a separate page*
	X Workshop Summerschool Conference Course
Location and Date	Paris, April, 13-15, 2011.
Organizer	**Name M- E. Brachet,** F. Moisy & B. Dubrulle
	Address CNRS, LPS, Ecole Normale Supérieure, 75231 Paris Cedex 05
	Country France
	Tel +33 1 44 32 25 20 **Fax** +33
	E-mail brachet@physique.ens.fr
Pilot Center(s) or SIGs involved	SIG 35, Henri Bénard PC, SIG 14
Co-organizing Associations	CNRS, CEA
Scholarships	**request scholarships ?** X Yes No
Rules	**I have read the document "Rules for holding ERCOFTAC event", which can be found on www.ercoftac.org, ERCOFTAC events:** XYes No

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Switzerland

To be filled-in by ERCOFTAC

Number	W2011-09

Date Received	30.9.2010
Discussed SPC & MB	**SPC** **MB**
Scholarships	Yes, Amount EURO No
Announcement	Bulletin
Report	Bulletin

ERCOFTAC/SIG 35 Workshop 'Statistical mechanics, fractals, instabilities, turbulence in fluids and superfluids'

This workshop can be seen as a follow-up of the Winter school at Les Houches, February 22-26, 2010, but at smaller scale and on a more focussed list of topics. This restricted list of topics was also addressed by an informal meeting in Imperial College, London, organized by Christos Vassilicos (active member of the SIG 35) in June 2010, but without explicit label or support from SIG 35, with local financial support.

According to the title of our SIG, 'Multipoint Turbulence Structure & Modelling' (MPTSM hereinafter), we continue to address fundamental issues and challenges of turbulence theory and modelling, but we keep in mind practical modelling for engineering and environmental flows. In this sense, a significant overlapping exists with the SIG 15, for instance with common interest in 'structure-based modelling' (S. Kassinos and coworkers, C. Cambon and coworkers, among others).

The apparent broad range of themes in the proposed title reflects different domains of competence by the participants (list below) but we share the same interest for investigating points of contact between our domains with cross-fertilization.

Four themes will be chosen

- Advances in modelling superfluid. Some studies (M. E. Brachet, B. Dubrulle, F. Daviaud) are at the cross-road of statistical classical mechanics and quantum mechanics. Very recent aspects are new theoretical and numerical results using a spectral closure (EDQNM, from the Kraichnan and Orszag's legacy) for the dynamics and statistics of superfluid Helium, as a bi-fluid (classical fluid and quantic fluid) medium (P. Sagaut).
- Revisiting instabilities and turbulence using basic concepts of statistical mechanics and new invariants (B. Dubrulle, A. Chiffaudel, A. Naso). The case of the von Kàrmàn flow will be mainly addressed, with bifurcations between different flow patterns and transition to turbulence, but other flows, with and without rotation (F. Moisy), will be discussed.
- From stable stratification to instable cases. Stably stratified turbulence is a long-term topic in the Lyon's team (ECL, list below). New recent elements yield to re-attack, with the tools of MPTSM, buoyancy-driven flows such as thermal convection (destabilising temperature gradient) and even Rayleigh-Taylor instability with transition to turbulence. Collaboration with the CEA (A. Llor, B-J Gréa) is particularly encouraging, from spectral approaches (RDT, nonlinear closures, supported by high resolution DNS towards LES) and engineering-oriented models, like bi-fluid $k - \varepsilon$. This theme is also important for the SIG 14 (J. M. Redondo).
- Fractal approaches. Experiments are carried out in the team of J. C. Vassilicos, which question the 'Kolmogorov's vulgate'. We hope to continue to discuss to what extent this gives new ideas and can suggest a renewest theoretical, and why not numerical, approach.

A provisional list of active participants is given below:

- J. Christos Vassilicos, Pedro Valente, Sylvain Layzet (Imperial College, London, UK)

- Pierre Sagaut (Institut Jean Le Rond d' Alembert, Paris)

- Frédéric Moisy (FAST, Orsay, near Paris)

- Marc Etienne Brachet (ENS Paris)

- Bérangère Dubrulle, François Daviaud, Arnaud Chiffaudel (CEA, CNRS Paris)

- Antoine Llor, Benoit-Joseph Gréa (CEA, DAM, near Paris)

- Aurore Naso, Wouter Bos, Claude Cambon, Fabien S. Godeferd, Andrew Lawrie (LMFA, Ecole Centrale de Lyon, France)

- Benjamin Favier (Newcastle, UK, formerly Lyon)

In order no to restrict this workshop to a London-Lyon-Paris event, an announcement will be sent to all the other members of SIG 35.

European Research Community On Flow, Turbulence And Combustion

WORKSHOPS/CONFERENCES/SUMMERSCHOOLS/COURSES
SUMMARY SHEET

Title	MORPHOLOGY and DYNAMICS of ANISOTROPIC FLOWS *Add a brief summary of the objectives of the activity (or the announcement) on a separate page (see the next page of this document, as well as the second document describing the project).*
	Workshop X Summerschool Conference Course
Location and Date	Centre d' Etudes Scientifiques de Cargèse, Cargese, Corsica, July 18-30, 2011.
Organizer	**Name** Luminita DANAILA, Fabien S. GODEFERD and J.B. FLOR
	Address CORIA UMR 6614 Avenur de l'Université BP12 76801 Saint Etienne du Rouvray
	Country France
	Tel +33 2 32 95 37 02 **Fax** +33 2 32 91 04 85
	E-mail luminita.danaila@coria.fr
Pilot Center(s) or SIGs involved	Henri Bénard PC, SIG 35, France-West PC
Co-organizing Associations	CNRS
Scholarships	**request scholarships ?** X Yes No
Rules	**I have read the document "Rules for holding ERCOFTAC event", which can be found on www.ercoftac.org, ERCOFTAC events:** XYes No

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Switzerland

To be filled-in by ERCOFTAC

Number	S2011-01

Date Received	1.10.2010
Discussed SPC & MB	**SPC** **MB**
Scholarships	Yes, Amount EURO No
Announcement	Bulletin
Report	Bulletin

Objectives of the summer school

In several domains, significant breakthroughs have been made possible thanks to techniques imported from other fields of research. These advances were permitted only because researchers used knowledge coming from different horizons.

The involved communities in the study of turbulence are numerous (classical fluid mechanics, physical mechanics, magneto-hydrodynamics, industrial processes, mixing, *etc.*). However, although some communities have developed sustained collaborations among one another, others remain rather isolated. In all these cases, turbulence problems concern anisotropic turbulence, which is the common ground. This is the reason why, nowadays, it seems necessary to gather researchers from different communities, often too separated from each other, in a School which will allow to **provide everyone with an interdisciplinary background about anisotropic turbulence and its different characterization tools** (complex mathematical tools), and to trigger exchanges and collaborations.

This objective falls right within the attributions of the Cargèse Institute for Science Studies, which provides an unique means for gathering specialists from diverse fields (statistical physics, signal processing, applied mechanics, fluid dynamics, …), directly involved in the study of turbulence, to bring them to confront their viewpoints and their results. The project is by nature inter-disciplinary. Among others, one aim is to make a link between researchers of different origins, and have them compare their approaches. The essential goal remains the necessity to evaluate the state of the art, to exchange and to reinforce and share the recent advances of the turbulence community, more precisely its division involved in the anisotropy of fluid flows. It is true that people from different communities (fundamental turbulence modeling, subgrid-scale models for large eddy simulations, micro-mixing, industrial processes, combustion) do not talk to each other enough if the occasion is not brought to them.

SUMMER SCHOOL 2011
DESCRIPTION OF THE PROJECT

Title:
MORPHOLOGY AND DYNAMICS OF ANISOTROPIC FLOWS

THEME:

Scientific context :
Most actual flows are anisotropic (rotating turbulence, sheared turbulence, wall regions *etc.*). A key characteristic of such flows is the loss of three-dimensionality, which leads in particular to the formation of coherent structures and waves, a typical signature of anisotropy present down to very small scales. In these contexts, the classical theory of turbulence, essentially based on the local isotropy hypothesis, is not applicable. While retaining the main tools and methods used in the analysis of isotropic turbulence (spectral methods, statistical and dynamical analysis), new developments can be done in order to interpret the *anisotropy of flows at all scales (both large and small)*, and thus to assess the limits of the existing theory and thus to progress in the *understanding of anisotropic turbulence*.
The goal of this school is to convey the core knowledge of the advanced understanding of anisotropic turbulence to researchers in different fields, based on the expertise of the speakers invited to the school. For this, we anticipate a series of comprehensive courses, with extensions in specialized conferences.

The fundamental courses are naturally organized along the following three axes:

1) ***Morphology of anisotropic flows***

The first question pertains to the *morphology of anisotropic flows*, *i.e.* the local and instantaneous structure of the flow (or a region of the flow). The flows which will be presented are: pure rotating flows (open or confined); rotating turbulence with mean shear (as in rotating channels); the dynamics of stratified fluids, and magneto-hydrodynamic flows (MHD).

2) **Statistical description of anisotropic flows**

a) Spectral space description
Fourier space (anisotropic decomposition along two directions: axial and radial) and transport energy equation in spectral space. The general anisotropic description is generated by divergence-free modes; the energy spectrum is generalized towards including four real terms (decomposition in ‘directivity-polarization-helicity’), associated with generalized energy transfers, via dynamical equations. In the axisymmetric case, the above terms depend on two components of the wavevector (radial and axial).

b) Physical space description
The physical space is divided into contributions, based on fields filtered at a given scale (increments). For instance, transport equations for the kinetic energy at a given scale can be expressed in the framework of axisymmetric homogeneous turbulence, in which a number of scalar functions are needed, which could be found from either experiments or numerical simulations.

3) **The statistics and dynamics of coupled fields**

Be it in spectral or physical space, the generalization of the statistics and dynamics of coupled fields is available, and is not restricted to the fluctuation velocity: advected scalar, active or passif, advected vector (scalar gradient, magnetic field in MHD). A last part of the program will be devoted to the mixing of passive scalar in axisymmetric flows. The mixing at Sc=1 (gas within gas, important for combustion applications, for instance), and high Schmidt number cases (liquids, industrial processes) will be discussed.

Advanced specialized courses:

1) A specific question concerns the presence of coherent structures (vortices), their size, persistence and dynamics in rotating flows. The accurate knowledge of the dynamics of these structures in close relation with the surrounding flow, opens the possibility to apply some control to them (active or passive). The surrounding flow can be simple, or populated with anisotropic waves that interact with the vortices and modulate, or even dominate (wave turbulence), the classical turbulent flow. These waves are present in the turbulence in rotating fluids, stratified flows, or conducting ones (in the MHD context).

2) The statistical description of anisotropic flows also requires to relate closely the spectral and the physical space statistics, a topic which will be discussed. Transport equations will be presented for the velocity field, but also for the vorticity field accessible via acoustic scattering techniques, or 3D PIV measurements.

3) We shall also consider more complex flows such as the axisymmetric jet, with or without adverse flow current (in which the shear region at the outer boundaries of the jet exhibit strong recirculations), recirculating turbulence in a mixing reactor. These flows can incorporate a strong anisotropy linked to the inhomogeneities.

4) In this last context, we will emphasize the practical importance of the specific modeling issues raised, with a careful treatment of the flows (and mixing) with rotation or swirl in a confined geometry, for instance in the combustion chamber with a swirl-enhanced burner. Many factors (not necessarily decoupled) are potentially at the origin of flame instabilities in such a chamber. Among them, one identifies: the shedding of organized vortex structures in the recirculation zone; the interaction between heat production and acoustics; spatial inhomogeneities and partial premixing between the fuel and the gas; … A conclusion emerges: the instabilities in a reacting flow are linked to complex phenomena, and their study generally requires to focus on the influence of one given parameter. Focusing on the role played by turbulent structures, their dynamics (stability/instability), is of prime importance in this study. We will specifically look at this dynamics in a simplified flow, including rotation or a recirculation, in that bringing a few elements for understanding the intricate puzzle of the phenomenology of reacting flows with rotation.

Organisation:

The duration of the school will be 14 days. The daily timetable is twice 3 hours, with a break devoted to discussions after each 90 minutes session, and a mid-day break favorable to direct exchanges between taught and teachers, and between researchers themselves. The lessons will be completed with the presentation of focused examples which elucidate some aspects of the theory. The contexts of the presentation will be made available to the participants on the Web site of the School. Organizational details are left to the responsibility of each professor in charge of a session, in particular as regards the diffusion of the lessons after the School.

Scientific Committee: *in charge of the elaboration of the project (thematics, goals, expected consequences for the targeted audience, selection of candidates)*

Robert ANTONIA
Claude CAMBON
Luminita DANAILA
Jan-Bert FLOR
Fabien GODEFERD
Keith MOFFATT
Philippe PETITJEANS
Christos VASSILICOS

Organization Committee : *in charge of the implementation of the project (programme, selection of speakers, professors and chairpersons, logical organization of the courses, practical matters)*

Luminita DANAILA
Jan-Bert FLOR
Fabien GODEFERD

SCIENTIFIC BACKGROUND AND GOALS:

Challenges :

Justification of the choice of the school's thematic and goals with respect to research:

- *Which diagnostic has led to the definition of the project?*

In several domains, significant breakthroughs have been made possible thanks to techniques imported from other fields of research. These advances were permitted only because researchers used knowledge coming from different horizons.

The involved communities in the study of turbulence are numerous (classical fluid mechanics, physical mechanics, magneto-hydrodynamics, industrial processes, mixing, *etc.*). However, although some communities have developed sustained collaborations among one another, others remain rather isolated. In all these cases, turbulence problems concern anisotropic turbulence, which is the common ground. This is the reason why, nowadays, it seems necessary to gather researchers from different communities, often too separated from each other, in a School which will allow to **provide everyone with an interdisciplinary background about anisotropic turbulence and its different characterization tools** (complex mathematical tools), and to trigger exchanges and collaborations.

This objectives falls right within the attributions of the Cargèse Institute for Science Studies, which

provides an unique means for gathering specialists from diverse fields (statistical physics, signal processing, applied mechanics, fluid dynamics, …), directly involved in the study of turbulence, to bring them to confront their viewpoints and their results. The project is by nature inter-disciplinary. Among others, one aim is to make a link between researchers of different origins, and have them compare their approaches. The essential goal remains the necessity to evaluate the state of the art, to exchange and to reinforce and share the recent advances of the turbulence community, more precisely its division involved in the anisotropy of fluid flows. It is true that people from different communities (fundamental turbulence modeling, subgrid-scale models for large eddy simulations, micro-mixing, industrial processes, combustion) do not talk to each other enough if the occasion is not brought to them.

- *Does the project go along a structured group (GdR, GIS, …) open to the scientific community?*

As detailed hereafter, the GdR « structure of turbulence and mixing » is a structure that gather a large part of the researchers in the discipline, among whom those interested with anisotropic turbulence.

- *Is it a new project linked with the emergence of a new theme or technique?*

This School federates the efforts of the different research groups among which the necessity to take into account the anisotropie of turbulence has recently come to the forefront.

- *Is it an interdisciplinary project whose goal is to bring together different communities?*

Although turbulence touches various communities, this is not one of the principal goals of the school.

- *What are the <u>scientific</u> goals of the School?*

This Schools aims at gathering the different communities having the study of anisotropic turbulence as a common background, or, in other words, in which the common issue to unlock is the anisotropy.
This will be the occasion to define and list clearly the different ways of tackling anisotropic turbulence, and to identify the specific problems of each research domain, and the methods used to treat them.
The final objective of the School is to raise the questions, and bring some answers to them, or offer more or less formal contact points for discussing them. In particular, we here have chosen to focus on anisotropic turbulence.

- *What are the <u>strategic</u> goals of the School?*

It has come to the community represented by the GdR « structure of turbulence and mixing » (« turbulence », in short) that it was necessary to open the GdR to more applicative flows, and to the communities sharing the common preoccupation of anisotropy of turbulence, either for its own sake, or as the result of the need to model the flow occurring in a broader problem (combustion, mixing, *etc.*)

This School is thus closely related to the GdR « Turbulence » (of which one organizer of the School is member of the Scientific Committee, and whose Director is also a member of the Scientific Committee of the School) and aims at defining the state of research in the different approaches to anisotropic turbulence, and to define the key difficulties occurring in different domains, as well as the possible solutions used to treat them.

We expect that the School will effectively improve the knowledge of the researchers in turbulence, and bring them new skills in the characterization and comprehension of anisotropic turbulence and to establish additional contacts and scientific collaborations.

The multiple aspects of the School and interdisciplinary character will produce exchanges and collaborations between the different communities themselves. One of the key points of this project is therefore to optimize the use of the existing knowledge.

In addition, the GdR « Turbulence » wishes to open itself to more applications, and the School will be a perfect opportunity to show to potential industrial partners, and to the researchers who already have collaborations with industry, the wealth and broad spectrum of the know-how of the community.

In short, the School hopes to federate a scientific community while in the meantime open itself to external ones and to applications.

Goal of the formation:

- *Justification of the « School » format*

In addition to teaching methods and the basics of turbulence analysis, this School will bring young researchers, doctoral students, and post-doctoral researchers, to increase their knowledge of anisotropic turbulence to a very advanced level. Moreover, we also offer hem the possibility, if they study in the domain and wish to do so, to present their own research work and to discuss with each other and with senior researchers. The chosen framework is therefore justified by the multiply-themed character of the presentations and of the expected discussions that will arises throughout the duration of the School.
Gathering researchers from different backgrounds and origins (experimentalists, numericists, theoreticians), who too often have a language and contradictory goals, in the framework of a « School », allows more informal exchanges and a better understanding of the specificities of each community.

Expected audience:

- *Priorily*
PhD students, post-doctoral researchers, researchers in the following domains : fluid mechanics, physics, geophysics and astrophysics.

- *Additional*
Engineers and researchers from industry, applied mathematicians.

- *Why is this audience targeted by the School?*

Because of the orientation detailed above, and the tools that will be presented.

- *Does the School answer a need coming from the expected audience?*

In view of the preoccupations stated during the meetings of the GdR « turbulence », there is definitely a need and an interest for an advanced curriculum dealing with the theme which will be developed.

Prerequisite:

- *What is the prerequisite knowledge to be able to follow the courses?*

No pre-requisite knowledge is expected from the participants, other than that of base knowledge in fluid mechanics and turbulence.

We will nonetheless ask explicitly to each speaker that a significant proportion of the beginning of their course (about 20%) be devoted to a pedagogical introduction to the subject.

EXPECTED CONSEQUENCES:

This project of School is expected to:

i) Teach and train young researchers (PhD students, research engineers or researchers arriving in the field) into the research topic concerned in the School.
ii) Bring together confirmed researchers, junior and young ones, but also doctoral students, all of them concerned with anisotropic turbulence (from a fundamental or applied point of view).
iii) Check the state of the main results obtained to this year in the correct and complete description of anisotropic turbulence.
iv) Introduce questions and debates about the hindrance met in the description of anisotropic turbulence.
v) Reinforce existing collaborations, or budding ones, between different researchers.
vi) Produce a net advancement of research in the field of anisotropic flows.

PRINCIPAL AXES OF THE PROGRAM (speakers denoted with * are still expected to confirm):

Introductory conference meant to be understood by a wide non-specialist audience will be given, aiming at situated the place and role of turbulence flows in a historical, technological, scientific and future science. J.-F. Muzy is expected for this presentation at the time of writing of the project, to be confirmed.

Fundamental courses:

1) Morphology of anisotropic flows:

*Marie FARGE * (CNRS, France) & Kai Schneider (U. Marseille, France): Space-scale analysis (wavelets decomposition)*
*Keith MOFFATT * (Cambridge University, U.K.) & Peter Davidson: Rotating flows, magneto-hydrodynamics*
Fréderic Moisy (Orsay, Paris): Anisotropic formalism and application to rotation

Christos VASSILICOS (Imperial College, U.K.): The fractal structure of turbulence

2) Statistical description and dynamics of anisotropic flows (spectral/physical space):

Annick POUQUET (Boulder, USA) & Pablo Minini (U. Buenos Aires, Argentine) : Astrophysical turbulence*
Laurent JACQUIN (Onera, France) : Stability of vortices*
Bruno ECKHARDT (U. Marburg, Allemagne) : Statistical mechanics for turbulence*
*Nikolaus A. ADAMS (TUM, Allemagne) *: Large Eddy Simulation*

Sedat TARDU (LEGI): Wall structures
Fabien ANSELMET (IRPHE): Structure of a flow on a rough wall

3) Statistics and dynamics of coupled fields (velocity and scalar)

Norbert PETERS (Aachen, Germany)

Workshops (round tables) :

L. Danaila (CORIA, France)

Specialized courses :

1) Morphology of anisotropic flows :

Robert ANTONIA (Université de Newcastle, Australie)
Yukio KANEDA (Nagoya University, Japan)
Philippe PETITJEANS (CNRS, France)
Dale PULLIN (Caltech, USA)*
Bruno RENOU (CORIA, France)
Pierre COMTE (Institut P', France : LES

2) Statistical description and dynamics of anisotropic flows (spectral/physical space):

Claude CAMBON (LMFA, France)
Robert RUBINSTEIN (NASA, USA)

Christophe BAUDET (LEGI, France)
Alain PUMIR (Lab. Physique ENS Lyon).*

PEDAGOGICAL CHOICES AND INNOVATING ASPECTS:

The main ***training elements*** of the School will involve:

- Presentations, seminars (presented by external speakers, or by participants) ;
- Group works, exercises, practical labs, workshops; poster sessions, informal exchanges slots, *etc*.

In addition to these organized parts, we leave some flexibility to set up specific study groups as called for by the participants, which will be possible thanks to the two-week format of the School.

Organization of the sessions:

During the two-weeks duration of the School, will be held courses taught by specialists from the international community. Each course will be decomposed into 1h30 slots in order to stimulate exchanges between the speakers and the participants. The conferences will be held in the morning and early afternoon (when the heat of the sun is dangerous). The remaining time will be devoted to less formal meetings around poster sessions and short oral presentations given by young researchers.

Hand-outs:

The documents used for the seminars will be provided to the participants. In order to save paper, we will limit the diffusion of printed hand-outs to only the fundamental courses, thus allowing the participants to annotate and follow easily the course. Specialized courses, with often color illustrations and multimedia parts, will be distributed in electronic form.

Publication of documents:

All the presentations will be accessible on the web site of the School in the form of pdf files to be downloaded by anybody. We do not foresee the production of other kinds of diffusion (such as proceedings) by want of time.

EVALUATION:

- *Evaluation procedures*

A final assessment of the School will be done the last day, in order to provide the participants with a synthesis of the training, including the following elements: overview of the programme, synthesis of the round tables, and of the open discussions.
We also expect the evaluation of the School by the participants regarding its usefulness, the interest of the chosen scientific toppics, the potential applications, the agreement of the level of the courses to the audience, the pedagogical side, *etc*.

PARTICIPANTS :

CNRS researchers and students (including BDI):		25
Other students and researchers (Europeans):		25
External participants (speakers, foreign speakers):		20
Total expected number of participants:	50+20+3=	**73**

PRACTICAL MATTERS:

- Justification of the location:

The Cargèse Institute for Scientific Studies is a center managed by CNRS and the University of Corsica, which offers logistic support and housing, which relieves the organizers from these talks and allow them to devote their time on the main scientific organization and on travel matters only.
The location and fame of IESC is attractive to both the best science researchers for the courses and conferences, and the students and young researchers. The secluded character of the center (out of the village), although pleasant (close to the sea shore), permits easy contacts among the participants during daytime, and is in favor of scientific exchanges.

- Preparation calendar

- 2009 : time slot reserved at the IES of Cargèse
- June 2010. Meeting with the permanent training delegation of CNRS.
- 1,2 July 2010 in Grenoble: **meeting** for preparing the financial applications. List of the eminent scientists to be invited.
- July to Decembre 2010: application for financial support to different organisms
- December 2010 in Lyon: **meeting** to establish the financial final sheet and finalize the participating speakers. Opening of the web site.
- From January 2011: announcement of the School in the GdR community, in specialized journals and on the existing diffusion lists (SIG, ERCOFTAC, heads of the involved laboratories, *etc*.). Mailing of the presentation sheet and the pre-inscription form to the schools and masters.
- Beginning of 2011: list of the applicants and preparation of practical matters (travels, *etc*.)
- June 2011 (location to be defined): final **meeting** before the beginning of the School: final list of participants, final organization of practical organization (travel, housing, excursions) in relation with the staff of IES.

- Communication

The scientific community in fluid mechanics and in turbulence is highly structured, so that we will rely on the existing networks. The largest possible communication will be done in the scientific community primarily concerned with the domain, but also in scientific communities potentially interested, as well as among private and industrial research organisms.
Announcements will be mailed, and we will prepare an announcement sheet in electronic format to attach to the mails. A web site will be set up, with the scientific program, the expectations of the School, and practical organizational matters.
The list of diffusion of the GdR « Turbulence » will be used, as well as other diffusion lists associated with European networks (among which ERCOFTAC and its Special Interest Groups). Posting in universities and laboratories will be asked from the heads or research and secretarial staff in the academic research institutes.