

COST ACTION FP1005

“Fibre suspension flow modelling - a key for innovation and competitiveness in the pulp & paper industry”

Minutes of the 7th Management Committee Meeting

Albanova Building, Nordita, Stockholm

5 June 2014

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1. Welcome

The participants of the Management Committee (MC) meeting were welcomed by the Action Chair, Dr Cristian Marchioli. Meeting opens at 10:00.

A total of 8 participants from the following 7 Parties attended the meeting: Finland (FI), Germany (DE), Italy (IT), Norway (NO), Poland (PL), Portugal (PT), Sweden (SE).

With 8 of the 17 (47%) Parties having accepted the MoU to date represented at this meeting the quorum of 2/3 required under COST rules (see COST 4159/10 Annex II Art. 8) is not attained. Minutes of this MC meeting were then approved by written procedure.

The list of participants in the meeting is presented in Annex 2, their contact details can be found on the COST website at http://w3.cost.eu/index.php?id=183&action_number=FP1005

2. Adoption of the MC meeting agenda

The agenda of the meeting was approved without changes or additions by the MC members.

3. Minutes of the last meeting

The minutes of the 6th COST FP1005 MC meeting that was held on 25 October 2013, at the Dept. Mathematics & Computer Science, University of Udine (IT) were approved unanimously.

4. News from the Chair (C. Marchioli)

The Chair informed the MC about current status of the Action: up to the date of the meeting, 17 countries are included in the Action. There has been no change in the MC.

The total number of Action participants up to the date of the meeting is 159, with 63 ESRs and 24 females (gender balance is therefore 15.1%, +1.1% since last MC meeting). The presentation is found in Annex 3.

The Chair also informed the MC about the outcome of the DC monitoring and showed the Monitoring statement approved by the FPS domain committee. Use of COST instruments (meetings, STSMs, training schools, workshops/conferences and publications) made by the Action over the first 3 grant periods was also shown.

5. Progress report of working groups

Due to the limited amount of participants left, it was decided to have no WG meeting. Therefore no progress report was given.

6. Action planning

The Chair updated the MC about the final claims for the 3rd Grant Period (GP) and current budget situation for the 4th GP (both shown in Annex 3). The budget allocated for GP4 is 108,200€. The amount allocated for STSMs is above 20% of the total scientific expenditure.

7. Short Term Scientific Missions (STSM)

The Chair reported on the status of STSMs up to the meeting date. The following STSM applications have been submitted and accepted during the 3rd GP:

14426	Daniel Queteschiner ESR	University of Linz, Austria	University of Udine, Italy	08.07.2013 02.08.2013	1729	Completed
15374	Lihao Zhao ESR	NTNU Trondheim, Norway	University of Udine, Italy	05.11.2013 16.11.2013	1440	Completed
16471	Carla Cotas ESR	University of Coimbra, Portugal	Czestochowa Univ. Technology, Poland	03.02.2014 05.04.2014	1956	Completed
16744	Salaheddine Skali-Lami	INPL Nancy, France	University of Udine, Italy	02.03.2014 11.03.2014	1500	Completed
16514	Jure Ravnik	University of Maribor, Slovenia	University of Udine, Italy	17.03.2014 11.04.2014	1731	Completed
18887	Cristian Marchioli	University of Udine, Italy	NTNU Trondheim, Norway	04.05.2014 16.11.2014	2500	Completed
20160	Jouni Elfvengren ESR	Tampere Univ. Tech, Finland	University of Coimbra, Portugal	24.05.2014 15.06.2014	1880	Approved
					S 12 736	

57% of STSM beneficiaries are ESRs (4/7), 14% are females (1/7).

8. Training Schools

8.1 TS 2014 on “Collective dynamics of particles: from viscous to turbulent flows”

The Chairman reported on the outcome of TS 2014 on “Collective dynamics of particles: from viscous to turbulent flows” (3rd GP):

- The TS was held at CISM (International Centre of Mechanical Sciences), Udine (Italy).
- The total number of participants was 41: 34 trainees (of which 13 were supported by Action FP1005) plus 7 lecturers (of which 3 were supported by Action FP1005).
- The trainees supported by Action FP1005 can be found in Annex 4
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- Dates: May 26-30, 2014
- Lecturers:
 - From Action FP1005: C. Marchioli, M. Maxey, M. Bourgoïn, H. Homann
 - Experts: J. Hinch, J. Butler, G. Bouchet
- The following topics were covered:
 - Gilles Bouchet - Aix-Marseille University, France - General introduction to scope and content of the course. Transition scenario in the wake of spherical and anisotropic particles (spheroids, discs, cylinders, fibres). Transition scenario of the solid-fluid systems (free falling or rising bodies interacting with the ambient fluid via hydrodynamic forces).
 - Michael Bourgoïn - University of Grenoble, CNRS, France - Collective effects of inertial particles in turbulent flows. Theoretical framework and phenomenology of particle-turbulence interactions. Experimental and numerical observations of preferential concentration. Analysis tools to diagnose preferential concentration and characterize clusters geometry. Open questions and ongoing researches.
 - Jason Butler - University of Florida, Gainesville, USA - Collective Stokesian dynamics of spherical particles and slender bodies suspended within viscous fluids. Governing equations and applications to sedimentation and shear flows.
 - John Hinch - University of Cambridge, UK - Small particles in highly viscous fluid; sedimentation and rheology. Low-Reynolds-number limit at the level of individual particles, small inertial correction. Sedimentation of one, few or many particles. Numerical issues. Rheology of a suspension: homogenization, rotations, deformations and interactions of particles.
 - Holger Homann - Observatoire de la Cote d'Azur, Nice, France - From point to finite-size particles: different physics, different numerical modeling. Details on the method of fictitious domains. Finite-size effects in the dynamics of individual particles. Collective effects of finite-size particles.
 - Martin Maxey - Brown University, Providence, USA - Numerical methods for modeling and simulation of rigid particles in fluid flow. Particle tracking equations with one-way or two-way coupling and their application. Approximate force coupling method (FCM) at low and finite Reynolds numbers. Immersed boundary methods, extensions to non-spherical particles and examples of applications in dispersed multiphase flows.

A workshop session on applications (coordinated by C. Marchioli) was also organized.
- The proceedings of the lecture notes will be published in the form of a book edited by Springer, most likely in the summer of 2014 (4th GP).
- TS webpage: http://www.fp1005.cism.it/pages/FP1005_ts2014coll.html

8.2 TS 2014 on “Particle characterization and multiphase flows monitoring”

The local organizer (Graça Rasteiro) informed the MC about the status of the TS:

- The TS was held at the Dept. Chemical Engineering, University of Coimbra, Portugal
- The total number of participants will be 19: 13 trainees (all supported by Action FP1005) plus 6 lecturers (of which 5 supported by Action FP1005).
- The trainees supported by Action FP1005 will be the following:
 - DEIVIDSON SILVEIRA <deiengq@yahoo.com.br>
 - DEESY PINTO <deesy.pinto@dem.uc.pt>
 - AHLAWAT PARAMVIR <pahlawat@student.ethz.ch>
 - LAURA AGUILAR PUCHE <sacripersonal@hotmail.com>
 - LETICIA FRANCO SÁEZ <leticia.franco.saez@gmail.com>
 - CARLA COTAS <carlacotas@gmail.com>
 - MELANIE MAYR <melanie.mayr@tugraz.at>
 - MATTIA SIMEONI <mattia.simeoni@uniud.it>
 - JOUNI ELFVENGREN <jouni.elfvengren@tut.fi>
 - ALBA PINO PULIDO <albapinop@gmail.com>
 - ROBERTO JUAN AGUADO GARCIA <rjagarcia@ucm.es>
 - TELMA MATIAS <tmatias@eq.uc.pt>
 - SANNA HAAVISTO <Sanna.Haavisto@vtt.fi>
- Dates: June 16-18, 2014
- Lecturers:
 - From Action FP1005: Juha Salmela <Juha.Salmela@vtt.fi>; Elena de la Fuente <Juha.Salmela@vtt.fi>; Pedro Faia, <faia@deec.uc.pt>; Paulo Ferreira, <paulo@eq.uc.pt>; Graça Rasteiro <mgr@eq.uc.pt>
 - Experts: Mark Martinez <martinez@chbe.ubc.ca>
- The following topics were covered:
 - Juha Salmela is a Rheology and Process Flows Research Team Leader at the VTT Technical Research Center of Finland. His expertise is focused on rheology of complex fluids, fibre suspension flocculation dynamics and in-line measurement of rheological properties. Currently his main interests include development Optical Coherence Tomography (OCT) to study boundary layer flow properties.
 - Mark Martinez is Professor in Chemical and Biological Engineering, and a complimentary appointment in Mechanical Engineering, at the University of British Columbia. His work focuses on the understanding of the fluid mechanics of fibre suspensions with applications in the Pulp and Paper sector.
 - Pedro Faia is a Professor at the Department of Electrical Engineering and Computers of the University of Coimbra where his research interests concern the research and development of solid state chemical sensors, sensor integration techniques, Electrochemical sensor and biosensors, Impedance Spectroscopy technique and applications.
 - Elena de la Fuente is a Professor at the Chemical Engineering Department of the Complutense University of Madrid. Her main research topic is the study of the flocculation processes and floc properties, mainly in the papermaking industry and for the fiber-cement production.
 - Paulo Jorge Tavares Ferreira is a Professor of Chemical Engineering at the University of Coimbra. His scientific interests are focused on the Pulp and Paper field, addressing topics such as characterization, modification and functionalization of pulps, fibres, papers, fillers and pigments, surface sizing, nano-coating, printability, and characterization and uses of nano-celullose.
 - Maria da Graça Rasteiro is a Professor of Chemical Engineering at the University of Coimbra. She is an expert on particle technology, including particle characterization, studies of particle interaction, rheology and modeling multiphase flows. She is presently the coordinator of the Chemical Engineering Research Centre of UC.
- The proceedings of the lecture notes will be published in the form of a book edited by Springer, most likely in the summer of 2014 (4th GP).
- TS webpage: http://www.fp1005.cism.it/pages/FP1005_ts2014monit.html

8.3 Proposals for TS in the 4th Grant Period (July 2014 – May 2015)

Proposals for training schools to be held in the 4th grant period were discussed. A final decision will be taken during the next MC meeting.

9. Action's Final Conference

The Chair informed the MC about possible hosts and venues for the Action's final conference. After careful examination of options and discussion, it was decided to hold the final conference at NTNU, Trondheim (Norway). The conference will be organized jointly with the EUROMECH Conference on "Anisotropic particles in turbulence" (Organizers: Helge Andersson and Alfredo Soldati). This will attract a larger number of participants (60 expected at least) and help making the event more successful. The Conference will be organized in June (tentative dates are 09-12 June 2015), namely after the Action's end date (May 10, 2015). Therefore it was also decided to ask for an extension of the Action's duration.

10. Dissemination

10.1 Publications

The Chair informed the MC about the current status of publications published in the frame of the Action. Up to the meeting date, there are 8 new publications on international ISI journals, and 7 Conference contributions, listed on the Action website. It is planned to publish two books, each consisting of a collection of the lectures given at the TS on "Non-spherical particles and aggregates in fluid flow" and at the TS on "Collective dynamics of particles: from viscous to turbulent flows". Publication is expected towards the end of the 4th GP.

Papers published in international peer-reviewed journals:

- L. Zhao, C. Marchioli, H. Andersson "Slip velocity of rigid fibers in wall-bounded turbulence", *Phys. Fluids*, **26** (2014), 063302.
- C.A.F. Ventura, F.A.P. Garcia, P.J.T. Ferreira, M.G. Rasteiro, "Modelling pipe friction loss of pulp fibre suspensions" Part. Sci. Tech., In Press (2014).
- L. Zhao, C. Marchioli, H. Andersson "Stokes number effects on particle slip velocity in wall-bounded turbulence and implications for dispersion models", *Phys. Fluids*, **24**, 021705 (2012); doi: 10.1063/1.3690071
- L. Zhao, H.I. Andersson, J.J.J. Gillissen "Interphasial energy transfer and particle dissipation in particle-laden wall turbulence", *J. Fluid Mech.*, **715** (2013), 32-59.
- C. Marchioli, A. Soldati "Rotation statistics of fibers in wall shear turbulence", *Acta Mechanica*, **224** (2013), 2311-2330.
- L. Zhao, H. Andersson, J.J.J. Gillissen "On inertial effects of long fibers in wall turbulence: concentration, orientation and fibers stresses", *Acta Mechanica*, **224** (2013), 2375-2384.
- F. Zhao, B.G.M. van Wachem "Direct numerical simulation of ellipsoidal particles in turbulent channel flow", *Acta Mechanica*, **224** (2013), 2331-2358.
- R. van Hout, L. Sabban, A. Cohen "The use of high-speed PIV and holographic cinematography in the study of fiber suspension flows" *Acta Mechanica*, **224** (2013), 2263-2280.
- E.J. Tozzi, D.M. Lavenson, M.J. McCarthy, R.L. Powell "Effect of fiber length, flow rate, and concentration on velocity profiles of cellulosic fiber suspensions" *Acta Mechanica*, **224** (2013), 2301-2310.
- M. Wilkinson, H.R. Kennard "A model for alignment between microscopic rods and vorticity", *J. Phys. A: Math. Theor.* **45** (2012), 455502.

Conference papers:

- C. Marchioli "FPS COST Action FP1005 - Fibre suspension flow modelling: A key for innovation and competitiveness in the pulp & paper industry" APS/DFD Meeting, Pittsburgh (USA), November 23-25, 2013.
- C. Marchioli "On the rotation of rigid fibers in wall shear turbulence" APS/DFD Meeting, Pittsburgh (USA), November 23-25, 2013.

- F. Lundell “Fluid vs. particle inertia: motions of non-spherical particles in shear” 1st Symposium on Dispersed Two-Phase Flows, ICNAAM 2013, Rhodos (Greece), September 21-27, 2013.
- A. A. Hoseini, Z. Zavareh, F. Lundell, and H. I. Anderson “Fiber tracking algorithm in combined PIV/PTV measurement of fiber suspension flow” 1st Symposium on Dispersed Two-Phase Flows, ICNAAM 2013, Rhodos (Greece), Sept. 21-27, 2013.
- C. Marchioli and A. Soldati “Rotation statistics of rigid fibers in turbulent channel flow” 1st Symposium on Dispersed Two-Phase Flows, ICNAAM 2013, Rhodos (Greece), September 21-27, 2013.
- J. Ravnik, C. Marchioli, M. Hriberšek, and A. Soldati “On shear lift force modelling for non-spherical particles in turbulent flows” 1st Symposium on Dispersed Two-Phase Flows, ICNAAM 2013, Rhodos (Greece), September 21-27, 2013.
- J.-C. Roux and J.-F. Bloch “Lubrication theory explains the modification of fiber properties in the refining process” 1st Symposium on Dispersed Two-Phase Flows, ICNAAM 2013, Rhodos (Greece), September 21-27, 2013.

It was also decided (1) to publish a Book of Proceedings collecting all the contributions that will be submitted to the Action's final conference and (2) to select invited papers (among those submitted to the final conference) for a Special Issue on one international scientific journal (possible options are the Proceedings of the Royal Society A or the International Journal of Multiphase Flow, to be decided).

10.2 Dissemination strategies

The following strategies to advertise the Action activities will be implemented:

- Submit a short paper on the Action's scientific achievements to Nordic Pulp and Paper Research Journal
- Present the Action and its activities at the 2014 ASME-FEDSM Conference (Chicago, August 03-07, 2014). This meeting is not organized by COST Action FP1005, but is relevant for the Action objectives, both to disseminate the Action's activities and to collect information to be further disseminated amongst the Action's members.
The Chair informed the MC that Prof. Alfredo Soldati has submitted an abstract (see Annex 6), which was accepted for oral presentation. The MC approves the request of Prof. Soldati to attend this Dissemination Meeting with a maximum contribution of € 500.
- Present the Action and its activities at IBEREO2015, the Iberian Rheology Conference that will take place in Coimbra (PT), 7-9 September 2015. The Action will organize a focus session on fiber suspension flow modelling. Participation of the Action to this Conference will also require an extension of the Action's duration.
Website: <http://www.uc.pt/en/events/ibereo15>
- Publish a review of experimental techniques for measuring fiber suspensions. The Chair will circulate this information among suitably-selected Action participants to identify volunteers willing to contribute and write the review. It is very likely that the review will be completed after the Action's end date (May 10, 2015), further justifying the request for an extension of the Action's duration.

10.3 Outreach activities

- Advertise the Action's activities (STSMs in particular) through the Association of European Fibre and Paper Research Organisation (EFPRO). Several Action members (A. Blanco, B. Breznik, W. Bauer, H. Grossmann, J. Poranen, W. Sampson) are also involved in EFPRO and will be asked to coordinate joint activities and events. In particular the Chair will contact the EFPRO Chair (H. Grossmann) and Secretary General (Martina Harting) asking to co-organize the Early Stage Researcher Workshop that EFPRO organizes every year in November.

11. Request for new members

The Chair informed the MC that, since the last MC meeting (Udine, 26 October 2014) no new application to join the Action, besides those of trainees that have attended or will attend the training schools, was received.

12. Promotion of gender balance and of Early Stage Researchers (ESR)

The Chair informed the MC that the percentage of female participants is 15.1% (+1.1% with respect to the previous MC meeting). The percentage of ESRs is about 39% (same as last MC meeting), Promotion of gender balance and of ESRs will be pursued through training schools and STSMs.

13. Non-COST country participation

The Chair informed the MC that no new applications from non-COST countries or institutions have been received at the date of the meeting.

14. Action website

14.1 Report on current state (C. Marchioli)

The Chair informed the MC that Knowledge Base section of the Action's website (www.fp1005.cism.it), which serves as data repository from the test case calculations, is being continuously updated with new data sets.

14.2 Discussion on further development and content

The Chair showed briefly the content of the website. The website will be updated continuously with useful information such as publications, scientific achievements, job opportunities, etc. The Chair has confirmed the will to continue taking responsibility of managing the website for free.

15. AOB

15.1 Place and date of next meeting

The MC decided that the next meeting of the Action would be:

Date	Event	Location	Justification
22-24 October 2014	Joint MC-WG meeting/workshop	Morphodynamique Continentale et Côtière (M2C), 24 Rue des tilleuls, Université de Caen (Campus 1) 14000 Caen, France	Accessibility (easy to reach from Paris) Cost of flights (to Paris) Availability of cheap hotels nearby

Local organizer will be Jean-Regis Angilella.

Scientific presentations from Action participants will be given as part of the program.

The WGs will organize parallel meetings on Thursday, October 23, 2014 in the afternoon (tentative meeting hours: 14:30 – 17:30), and the MC meeting on Friday, October 24, 2014 (tentative meeting hours: 9:45 – 11:45).

The MC decided that:

- (1) participation fees for this meeting should not exceed € 1000 for members of the Action (exceptions are only possible if well motivated)
- (2) the accommodation reimbursement rate will be € 120/night.

14.2 Tour de Table

MC members presented present/future national coordination and communication activities. These will be summarized in specific reports.

15. Closing

The MC meeting closed at 12:30.

Cristian Marchioli
Chair
COST Action FP1005

ANNEXES

Annex 1: Meeting Agenda

http://www.fp1005.cism.it/downloads/FP1005_MC7_2014_06_03-05_Agenda.pdf

Annex 2: Attendance List

NAME	STATUS	e-MAIL	NAME	STATUS	e-MAIL
Helge Andersson	MC Member Norway	helge.i.andersson@ntnu.no	Dariusz Asendrych	MC Member Poland	darek@imc.pcz.cz est.pl
Alfredo Soldati	MC Member Italy	soldati@uniud.it	Fredrik Lundell	MC Member Sweden	Fredrik@mech.kth.se
Cristian Marchioli	MC Chair Italy	cristian.marchioli@uniud.it	Maria Graça Rasteiro	MC Member Portugal	mgr@eq.uc.pt
Martin Sommerfeld	MC Member Germany	martin.sommerfeld@iw.uni-halle.de	Pentti Saarenrinne	MC Substitutue Finland	pentti.saarenrinne@tut.fi

Annex 3: Presentation of Chair



FP1005_MC7_Presentation.pdf

Annex 4: TS “Collective dynamics of particles: from viscous to turbulent flows”



Bouchet-Marchioli_41.pdf

Annex 5: TS “Particle characterization and multiphase flows monitoring”



COST TRAINING ACTION COIMBRA.pdf

Annex 6: ASME/FEDSM Dissemination Meeting Abstract



FEDSM2014-22035.pdf