

COST

Domain Committee MPNS

COST Action MP1106

Start Date 11/05/2012

Smart and green interfaces - from single bubbles and drops to industrial, environmental and biomedical applications (SGI)

MONITORING PROGRESS REPORT

Reporting Period: from 11/05/2012 to 01/06/2013

This Report is presented to the relevant Domain Committee.
It contains three parts:

- I. Management Report** prepared by the COST Office/Grant Holder
- II. Scientific Report** prepared by the Chair of the Management Committee of the Action
- III. Previous versions of the Scientific Report;** i.e., part II of past reporting periods

The report is a “cumulative” report, i.e. it is updated annually and covers the entire period of the Action.

Confidentiality: the documents will be made available to the public via the COST Action web page except for chapter *II.D. Self evaluation*.

Based on the monitoring results, the COST Office will decide on the following year’s budget allocation.

Executive summary (max.250 words):

The aim of the MP1106 Action is to organize a Europe-wide interdisciplinary cooperation platform directed towards scientific added value and improvement of industrial/environmental/medical applications concerning interfaces, bubbles and drops. The scientific objective is to identify and implement best strategies and means to tailor Smart & Green interfaces and accurately control their performance by concerted action of the most active European research institutes and companies in the field. To meet this challenges the Action brings together science and technology teams of disperse expertise from Europe (and beyond) to reinforce academia-industry interaction at early stages of knowledge development. During the first year of the Action we organized a combined MC/WG1-4 meeting, one training school and ther first annual conference. From the 10 STSMs, 8 were conducted by Early Stage Researchers. To date, a total of 33 joint publications have been published or submitted for publication. In addition, the COST Action acts as a springboard for collaborative funding applications: several joint applications have been submitted both to EU and to national programmes, some of which have been accepted for funding. For next year planned activities include three training schools, several STSMS, three Combined WGs meetings and the second annual conference.

I. Management Report prepared by the COST Office/Grant Holder



I.A. COST Action Fact Sheet

- **COST Action MP1106** - *Smart and green interfaces - from single bubbles and drops to industrial, environmental and biomedical applications (SGI).*
- **Domain** MPNS

- **Action details:**

CSO Approval: 01/12/2011

End date: 10/05/2016

Entry into force: 06/01/2012

Extension: (day/month/year)

- **Objectives** *Bubbles and drops are entities of enormous practical interest since their interfaces are met in numerous industrial processes and applications of every day life. In order to enhance efficiency, the creation of revolutionary Smart interfaces is demanded: interfaces that are easily manipulated with well-controlled size and properties. The acute modern environmental problems require attributing eco-friendly features to Smart interfaces by incorporating innovative materials or processes. The outcome is Smart and Green (S&G) interfaces. The objective of this Action is to organize a network of groups from academia and industry in order to identify best strategies and means to produce S&G interfaces. Furthermore, state-of-the-art experimental, theoretical and numerical work will be combined to acquire insight into the underlying phenomena through the scales and across the disciplines for the implementation of S&G interfaces in industrial, environmental and biomedical applications. The Action's main deliverables are the networking between groups working on different aspects of S&G interfaces through organization of scientific events, training schools and STSMs, and the industrial interface to market new technologies. The professional perspectives of ESRs will be boosted through an extensive mobility program. The Action's main benefit is the endorsement of the European scientific and industrial leadership in this field*

- **Parties:** *list of countries and date of acceptance*

Austria 30/01/2012	Greece 23/01/2012	Poland 18/01/2012
Belgium 09/02/2012	Hungary 05/03/2012	Portugal 06/01/2012
Bulgaria 20/01/2012	Iceland -----	Romania 15/03/2012
Croatia 11/01/2012	Ireland 16/01/2012	Serbia 24/02/2012
Cyprus -----	Israel 27/12/2011	Slovakia 23/03/2012
Czech Rep. 10/02/2012	Italy 13/01/2012	Slovenia 05/01/2012
Denmark 29/03/2012	Latvia 07/11/2012	Spain 04/01/2012
Estonia 11/04/2012	Lithuania 23/05/2013	Sweden -----
Finland 03/05/2012	Luxembourg 27/04/2012	Switzerland 14/12/2012
FYR of Macedonia -----	Malta -----	Turkey 15/03/2012
France 23/03/2012	Netherlands 17/01/2012	United Kingdom 09/12/2011
Germany 18/01/2012	Norway 02/02/2012	

- **Intentions to accept:** No

- **Other participants:**

University of Alberta, Canada, Alberta

Lafayette College, USA, Easton

Ian Wark Research Institute, Australia, Adelais

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- **Action Web site:** <http://cost-mp1106.lcpe.uni-sofia.bg/>
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- **Working Groups** (list of WGs and names and affiliations of participants)

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WG3: Diagnostics

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WG4: Technology

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WG ESR (Early Stage Researchers)

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I.B. Management Committee member list

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Schools

Title	Date	Place	Cost	Total
Smart materials with a Green aspect	23/04/2013 to 25/04/2013	Twente, Netherlands	28982.21	28982.21

Dissemination

Title	Date	Place							Cost	Total
Action Website	2012-11-04	web							1300	
Other (Action Website)	2013-03-27	web							700	2000

Others

Banking costs	152.70
FSAC	20765.07

Action Total :**214113.8**

II. Scientific Report prepared by the Chair of the Management Committee of the Action, describing results achieved during the Action operation in this period, in no more than 3 pages (the report is “cumulative”). All items listed in Sections A, B, and C, below, must be addressed.

Additional documentation such as extended scientific reports, proceedings of workshops, seminars or conferences may be provided separately as an annex to this report, and should be referenced in the report.

II.A. Innovative networking

- Innovative knowledge resulting from COST networking through the Action. (Specific examples of Results vs. Objectives)

Below are some of the projects realized in the frame of WGs that yielded new knowledge. It is a particular feature of the Action that many members participate in several WGs so discrimination per WG is not easy. Due to space limitations only the name(s) of the basic coordinating scientist(s) are mentioned.

1. *Physicochemical and rheological properties of two novel non-conventional biocompatible and biodegradable glycerol ether surfactants (Karapantsios, GR. Liggieri IT, Dutschk NL)*
2. *Effective methods of aerosol production for novel inhalation therapies. Indicating the influence of aluminosilicate nanoparticles on the surface activity of the lung surfactant (in vitro study related to inhalation toxicology problems). Indicating new approaches to effective powder aerosolization in medical inhalers by converged (focused) and pulsating airflows (Sosnowski, PL)*
3. *Surfactant Multilamellar Vesicles deformation in flow have been interpreted in terms of the internal microstructure and described on the basis of non-dimensional scaling parameters (Guido & Caserta, IT)*
4. *Silver nanoparticles (Ag NPs) synthesized by a biochemical reduction method. An aqueous solution of extracted dye from Punica Granatum bark was used as a reducing agent for synthesis silver nanoparticles from silver nitrate. The antibacterial potential of biosynthesized silver nanoparticles against E-coli was examined qualitatively and quantitatively (Dutschk NL & Šaponjic RS)*
5. *New nano-particle containing adhesives. The addition of nano-particles to the adhesive led to higher fracture energy as well as smaller crack growth rates (Shanahan FR)*
6. *Wetting of thin cones. A theoretical study of the behaviour of the behaviour of dewdrops on “spindly” leaves with relevance to the production of nano-fibre composites (Shanahan FR)*
7. *Production of uniform, well dispersed, adhesive TiO₂ surfaces by sputtering that present repetitive antibacterial action under light on polyethylene (PE), polyester (PES) and cotton (Kiwi, CH).*
8. *Progress in thin film drainage apparatus for foam stability measurement (Karapantsios, GR, Miller DE)*
9. *Rising bubble experiments with mixed protein/surfactant solutions gave new insight into the formation and composition of dynamic surface layers, leading now to the elaboration of a new theoretical approach on the formation of rear stagnant caps for rising bubbles (Miller, DE, Malysa PL)*
10. *New insights in the mechanism of bubble bouncing at liquid/gas interfaces. (Zawala, PL, Caps, BE)*
11. *Indicating the influence of aluminosilicate nanoparticles on the surface activity of the lung surfactant (in vitro study related to inhalation toxicology problems) (Sosnowski, PL).*
12. *Particulates for stabilizing foams & emulsions; nanotechnology for human health applications (Navarini, IT).*

13. *Data obtained for the effect of several surfactants on shape oscillations of bubbles and drops. The objective of these data is a possible enlargement of ADSA method for fast information on the interfacial elasticity at very high frequencies (Vejrazka CZ).*
14. *New method for measuring polymeric time scales by evaluating damped drop shape oscillations. Measured time scale is the deformation retardation time. A way of predicting properties of particles produced by the emulsion extraction method as functions of the parameters of the emulsion formation and extraction kinetics. (Brenn, AT).*
15. *In continuous laser droplet generation from a metal wire, four different detachment regimes with the corresponding dynamics are identified (Govekar, SL).*

- Significant scientific breakthroughs as part of the COST Action. (Specific examples)

Scientific results that can be considered as breakthroughs are:

1. *Detection of toxic potential of inhaled dusts by physicochemical assays. Indicating the proper techniques of spraying liposome colloids and cell suspensions for medical purposes (inhalation therapy) (Sosnowski, PL)*
2. *Cu/TiO₂ supported photocatalysts antibacterial surfaces that use air(O₂), H₂O vapor in the air and sunlight to decrease pathogens and avoid the buildup of infectious biofilms (Kiwi, CH)*
3. *Methodology to characterize non-fluid adsorption layers and resolve the structure of multi-component adsorption layers (Marinova BG, Unilever NL, Kruss DE)*
4. *Advancement in electrical resistance tomography for measuring gas/liquid fraction in emulsions, foams, two phase dispersed flows (Karapantsios, GR, Gonzalez-Cinca ES)*
5. *Stem cells that lead to differentiation up to "beating" cardiomyocytes on Organic Field-Effect Transistors (OFET) that can represent a powerful tool for the detection of bio-signals because of their electrically active surface is an organic film (Guido IT).*

- Tangible medium term socio-economic impacts achieved or expected. (Specific examples)

At this stage it is too early to predict tangible socio-economic impacts. However, a major part of the commercial and industrial sector with activities in the field of smart and green interfaces as end-users or technology developers is based in Europe. This is manifested by the considerable industrial participation in the Action. The Action is clearly targeted towards applications and this is expected to lead to an economic impact in medium term but it is premature to quantify at present.

Seven PhD students and nine MS students started their work in the Action teams ([Annex I](#)).

- Spin off of new EC RTD Framework Programme proposals/projects. (List)

1. *ERC Starting Grant on using the self-organisation of interfacially active agents for the generation of porous solids with physic-chemically well-controlled surface properties (Drenkhan/Langevin FR)*
2. *Marie Curie EU-ITN multi-partner proposal 'Complex Spread', approved, Kick-off pending (Gambaryan—Roisman DE, Starov UK, Miller DE, Dutschk NL, Karapantsios GR)*
3. *European Space Agency/ELIPS, FASES-Fundamental and Applied Studies in Emulsion Stability (Liggieri IT, Antoni FR, Miller DE, Karapantsios GR, Dutschk NL)*
4. *European Space Agency ESA/ELIPS, PASTA PArticle STAbilised Emulsions and Foams (Miller DE, Liggieri IT, Antoni FR, Karapantsios GR, Dutschk NL).*
5. *OPTIMISED, FP7 BSE-SME Project ID 606506 (Drop Technology IR, Perova IR, Karapantsios GR, Aluivent Zrt. and Femalk Zrt. HU, Ocean Optics NL, Gabrerizo ES, and Gambaryan—Roisman DE; decision not funded.)*
6. *SCADA-Water, ICT-2013.6.3 ICT for water resource management, (Drop Technology, IR; decision August 2013)*
7. *ESA/GSTP In-Vivo Embolic Detector (I-VED) Phase IVa (Karapantsios GR, OHB DE)*
8. *ESA/NPI Bubble dynamics during degassing of liquids (Karapantsios GR).*

9. *Modelling drying droplets on porous substrates* (Kuersten, Wijshof, vdGeld NL)
 10. *ManuNet pre-proposal "Enhanced Computer-Aided Process Engineering" submitted;* (Peters LU).
 11. *CORE proposal "LASCOPE (Large Scale Optimisation in Process Engineering)" under preparation* (Peters LU).
 12. *ESA/ELIPS, Project MAP* (Colin FR, Legendre FR, Wylock, BE, Haut BE and Colinet BE)
 13. *EPSRC/EU Call identifier: FP7-NMP-2013-LARGE-7* (Sefiane UK).
 14. *Preparation of a new ESA/ELIPS project on EVAPORATION involving ULB-TIPs* (Colinet BE), *UAM-MADIREL* (Antoni FR), *IUSTI* (Tadriss FR, Brutin FR), and *TUD* (Stephan DE Gambaryan DE), among other teams not part of this COST project.
 15. *Phenomenological studies on COrium COncrete Interaction (COBE), Type of funding scheme: Integrating Collaborative Project, Call identifier: Agence Nationale de la recherche and Commissariat à l'énergie atomique* (Antoni FR).
- Spin off of new National Programme proposals/projects. (List)
 1. *Industrial project: Protein-stabilized foams*, (Fairhurst, UK)
 2. *Industrial project: Shell/FOM concerning DNS of annular mist flow with waves at the liquid film on the wall* (Kuersten, vdGeld NL).
 3. *'Development on nano-based inks for functionalization of textiles' submitted to NWO* (The Netherlands organization for Scientific Research) (Dutschk, NL)
 4. *Proposal submitted to STRATEGMED - national strategic program focused on prevention and therapy of diseases of affluence. The project relates to prevention and therapy of diseases of affluence, and its results should lead to improvement of health and quality of life - passed the first stage of evaluation* (Sosnowski, PL)
 5. *"Influence of the structure of fractal-like aggregates on aerosolization process in complex flow systems"* (OPUS-4 program: 2013-15 Polish National Science Centre (NCN) (Sosnowski, PL)
 6. *Multiphase fluids management in low gravity environment*, (Spanish Ministry of Economy and Competitiveness), (Gonzalez-Cinca, ES)
 7. *"Antibacterial surfaces in hospital tests" project approved by the SNSF in collaboration with the Univ Hospital in Lausanne* (CHUV) (Kiwi, CH)
 8. *Project on multiple emulsions submitted to DFG* (Miller, DE).
 9. *Industrial project : Optimization of the foamscan instrument* (Langevin & Teclis, FR)
 10. *industrial project: High frequency/inkjet drop formation* (Katona, RS)
 11. *Interfacial properties, their diagnostics and their effects on macroscopic flows* (research project funded by Ministry of Education, Also, 2 proposals submitted to Czech Science Foundation: *Influence of hydrodynamics on size and structure of aggregates formed during coagulation/flocculation process and Investigation of structure-property relationships and breakage dynamics of complex granular materials* (Vejrazka CZ)
 12. *Use of microgravity and hypergravity to study heat and mass transfer during frying, GRAVI-FRYING, submitted to General Secretariat for Research and Technology under the framework of EXCELLENCE II* (Karapantsios GR; decision pending)
 13. *Internal industrial project aimed at investigating food foam structure and sensory properties* (Navarini Illy, IT)
 14. *Industrial project: Procter & Gamble* (Starov UK).
 15. *EPSRC* (Starov UK).
 16. */Micro-MAST (Multiscale Applications of Surface Tension: Microfluidics and Micromanipulation) : Belgian BELSPO-funded PAI network 2012-2017* (partners : ULB-Brussels, ULg-Liège, KUL-Leuven, UMH-Mons, ESPCI-Paris) (Colinet BE).
 17. *Dielectrowetting: Controlling Oleo- and Hydrophilicity and Shaping Liquid Surfaces*, G. McHale (PI), *EPSRC EP/K014803/1* (15/7/13-14/7/16). Also, one new national project submitted to EPSRC for consideration (McHale UK).
 18. *Grants for 2 Ph.D. students to participate in a school (Non-spherical particles and aggregates in fluid flows, Udine), and a conference (Dynamics of active suspensions,*

gels, cells and tissues, Cambridge) - Investment in ESR development. Also, national project under preparation (Ekiel-Jezewska PL).

II.B. Inter-disciplinary networking

- Additional knowledge obtained from working with other disciplines within the COST framework. (Specific examples)

MP1106 Action is by definition a multi-disciplinary network that acts as a catalyst to pool knowledge, methods and techniques together and enable intellectual and practical exchanges. So responses to this section actually coincide with those at the previous one. Most STSMs have given the applicant to have access to specialized techniques and knowledge not available in the host lab. Yet, to discriminate further we present below knowledge gained from collaboration with colleagues outside MP1106.

- 1. Nano-functionalization of textile materials (MP1106 & CM1101; Dutschk NL & Šaponjic RS)*
 - 2. Adhesive, robust, uniform durable anti-pathogenic surfaces to disinfect hospital rooms, schools, public places decreasing the amount of pathogens through surface photo-switching induced by low intensity solar irradiation or indoors actinic/visible commercial white light (MP1106 & TD906; Kiwi CH)*
 - 3. Inputs from number of other members of COST MP1106 project in chemistry, surface science and instrument engineering as part of EU proposal submissions (McMillan IR).*
- Evaluation of whether the level of inter-disciplinarity is sufficient to potentially provide scientific impacts. (Specific examples)

As originally planned, MP1106 Action combines scientists of various expertise and background that bridge the gaps through the scales and across the disciplines in terms of state-of-the-art experimental, theoretical and numerical work. So the level of inter-disciplinarity in the action is more than sufficient to produce scientific impacts. This is reflected to the presented list of new EC RTD Framework Programme proposals/projects where indeed projects involve scientists from different disciplines. For instance, the two projects, Marie Curie EU-ITN 'Complex Spread' and ESA/ELIPS, PASTA Particle STAbilised Emulsions and Foams involve physicochemists, material scientists, mechanical engineers, chemical engineers, physicists, chemists, biologists, mathematicians etc. Interdisciplinarity is also reflected to many common publications on the results of the first year of the Action activity ([Annex II](#)).

- Evaluation of whether the level of inter-disciplinarity is sufficient to potentially provide socio-economic impacts. (Specific examples)

As mentioned above, it is too early at this stage to argue about tangible socio-economic impacts. However, MP1106 Action is expected to have in the future appreciable impacts not only as a result of the sufficient inter-disciplinarity of the participating partners but also because of the clear orientation towards applications (industrial, environmental and biomedical). On this account, the last year there have been submitted two European patents applications with PI the Aristotle University of Thessaloniki (Karapantsios GR) and there are also three pending patents with PI Drop Technology (McMillan IR).

II.C. New networking

- Additional new members joining the Action during its life.
27 signatory parties (countries) have signed the MoU up to the date of the kick-off meeting. During the first year, Latvia, Switzerland and Lithuania have joined the Action bringing the number of signatory parties to 30. Participation to Working Groups has changed since the beginning of the Action: WG1 from 45 to 42 members (from 27 countries), WG2 from 40 to 79 (from 25 countries), WG3 from 39 to 38 members (from 21 countries), WG4 from 33 to

33 members (from 20 countries). Not registered in WGs: from 62 to 34 members (not involved yet in any activity). Many members participate in more than one WG.

- Total number of individual participants involved in the Action work. (Number of participants. Give % of female and of Early Stage Researcher participants)
At the end of the 1st year the Action involves 385 individual members from 102 research groups. From them, females are 27% and ESRs are 54%.
- Involvement of Early Stage Researchers in the Action, in particular with respect to STSMs, networking activities, and Training Schools. In addition, justification should be provided if less than 4 STSMs were carried out during the year.
From the 10 STSMs of the 1st year of the Action, 8 were conducted by ESRs (Annex III). The Action has a high number of ESRs and there is a dedicated ESR Group containing ESRs horizontally from all WGs to help in organizing workshops and training schools/seminars, promoting interaction within the WGs and disseminate post-doc/work placements. Some ESRs are MC members and therefore directly involved in the management of the Action. About 25% of presentations during WGs meetings and the annual conference were delivered by ESRs. A Training School was organized during the 1st year of the Action under the title "A way to Smart Europe" The Training School included 12 lectures (from 9 countries), 2 laboratory visits and 3 interactive Workshops. The aim was to creatively address the challenge of transforming ideas from polymer and bio/nano research into industrial applications. 23 ESRs (postdocs, PhD students and MS students) from 13 countries attended the Training School under reimbursement from MP1106 Action.
- Involvement of researchers from outside of COST Countries. (Number of participants from non-COST Countries approved by the CSO. Give % of such participants from countries with reciprocal agreements. Specify their contribution)
Five institutions from NON-COST countries have participated in the Action meetings. They were from Australia (1), New Zealand(1), USA(1) and Canada(2). In addition, there was also a researcher invited as external expert from Russia (Neighbouring COST countries). Colleagues from Australia and New Zealand were financially covered by Reciprocal Agreements which corresponds to 2/6, i.e., 33%. These experts are prominent scientists in the field of interfacial phenomena and two phase flow and have communicated the state-of-the-art in the field experimentally and theoretically. Two of these experts have given keynote lectures during the annual conference.
- Advancement and promotion of scientific knowledge through publications and other outreach activities. (Number of publications and other outreach activities that resulted from COST networking through the Action. Complete list should be given in an annex)
*More than 30 publications have been published or submitted by the Action members (list in Annex II).
Two European patents applications have been submitted by the team in the Aristotle University of Thessaloniki (Karapantsios GR) and there are also three other pending patents submitted by PI Drop Technology (McMillan IR).
During the first year of the network, an active website for exchange of information and for making public the action activity has been created (Annex IV).
A number of Gender Balance activities have also been implemented (Annex V) promoting the participation of female members in the Action.
Under the responsibility of WG4 a survey was conducted of all the partners of the Action on their views and activities on Commercialisation, IP and related matters . The results are summarized in Annex VI.*
- Activities and projects with COST network colleagues.
*Apart from STSMs, there has been also a large number of collaborations among individual Action members on many science aspects of Smart and Green Interfaces (Annex VII).
At the 1st annual conference of the Action three Round Tables were organized on specific thematic areas of high significance: a) Food, Biotechnology and Biomedical Applications b)*

Nanotechnology & Nanoscience and c) Energy and Environment. In these Round Tables it was decided to establish interdisciplinary clusters of members on specific topics with emphasis to applications. These clusters will be given the freedom to organize meetings in order to discuss science matters and coordinate efforts towards submitting proposals to forthcoming EU Research Calls. A report of the results of the Round Tables can be found in Annex VIII.

Further to the above, a series of other activities have been organized by members during the 1st year of the Action:

1. Workshop on Materials and Processes for Energy Applications jointly with COST actions: MP1004, MP1103
 2. Workshop: Inkjet Printing on textiles: Nanos and electronics(Dutschk, NL)
 3. A platform is being created where industries could find help for measurements/projects related to bubbles and drops (Langevin, FR)
 4. Workshop on wetting on complex systems in Marseille (Fairhurst UK, Brutin FR).
 5. Advanced school on "Fluid foam physics" to be held 3-9 November 2013 in Orsay, France (involved project partners: Langevin FR, Drenckhan FR, Denkov BG).
- The capacity of the Action members to raise research funds.
There is a considerable capacity of Action members to raise research funds. For instance, Prof. Moghimi (DK) is currently partnering two large-scale competitive European Commission FP-7 programmes in translational nanomedicine/drug delivery with secured budgets of €11 million and €8.5 million, respectively. In addition, an ERC Starting Grant of 1.5 Million Euro for the period 2012-2017 have been secured by Dr. Drenckhan in the lab of Prof Langevin (FR). Polish partners have attracted approximately 1 Million Euro from their national strategic program on 4 projects (Sosnowski PL).. Netherlands partners participate in 4 STW projects and 1 FOM project with a total budget of 5.0 MEuro (Kuerten, Wijshof, vdGeld NL). UK partner got a EPSRC grant £360k (McHale UK).

III. Previous scientific report(s)

Part II of past periods' reports are to be found here.

Annex I

New PhD/Master students in the topic of this COST action for the 1st year of the Action

1. E. Georgiou (MS student: developments on thin film drainage) (Karapantsios GR)
2. Jooyoung Won (PhD on drop/bubble coalescence) (Miller DE)
3. Narges Moradi (MS on protein conformational changes at interfaces) (Miller DE)
4. Marzieh Lotfi (PhD on simulations of rising bubbles in surfactant solutions) (Miller DE)
5. Vamsee Ulaganathan (PhD on molecular foam fractionation) (Miller DE)
6. Inga Retzlaff (MS on protein stabilized foam films) (Miller DE)
7. One PhD student and three master students joined the group since the start of the Action (Gonzalez-Cinca ES)
8. One new PhD student since February 2013 (Marinova BG)
9. Alexander Kuznetsov (PhD on characterization and stabilization of laser droplet generation process) (Govekar SL).
10. One PhD student and 3 M.Eng students on smart and green instrumentation (McMillan & Kennedy IR)

Annex II

List of publications during the 1st year of the Action

1. C.D. Ampatzidis, E-M.A. Varka, T.D. Karapantsios, 2013 Dynamic surface properties of eco-friendly phenylalanine glycerol ether surfactants at the W/A interface, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, In Press.
2. C.D. Ampatzidis, E-M.A. Varka, T.D. Karapantsios, 2013 Adsorption behavior of non-conventional eco-friendly tyrosine glycerol ether surfactants, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, In Press.
3. The effects of molecular weight, evaporation rate and polymer concentration on pillar formation in drying poly(ethylene oxide) droplets, *Colloids and Surfaces A*, 2012: David Fairhurst
4. Majid Nasiri Boroumand, Majid Montazer, Jolanta Liesiene, Zoran Šaponjic, Victoria Dutschk: Novel method for synthesis and application of silver nanoparticles on wool, *Proceedings of the Textile Congress Istanbul*, May 2013.
5. Sosnowski TR, Kurowska A., Butruk B. (2013). Atomization of living cells from aqueous suspensions. *J. Aerosol Med Pulm. Drug. Del.* 26(2): A40-A41 (ISAM Congress abstract)
6. Sosnowski TR, Jabłczyńska K. (2013) Aerosol droplet size in the pulsed jet nebulization. *J. Aerosol Med Pulm. Drug. Del.* 26(2): A41 (ISAM Congress abstract)
7. Sosnowski T.R., Kurowska A., Butruk B., Jabłczyńska K. (2013) Spraying of cell colloids in medical atomizers – *Chem. Eng. Transact.* 32, 2257-2262
8. Sosnowski T.R., Giżyńska K., Żywczyk Ł. (2013) Fluidization and break-up of powder particle aggregates during constant and pulsating flow in converging nozzles - *Colloids and Surfaces A: Physicochemical and Engineering Aspects* - accepted, DOI:10.1016/j.colsurfa.2013.04.018)
9. S. Arias and R. González-Cinca, *Chemical Engineering Science* 91, 5 (2013).
10. F. Suñol and R. González-Cinca, *Chemical Engineering Science* 97, 272 (2013).
11. Baldwin K.A., Roest S., Fairhurst D.J., Sefiane K., Shanahan M.E.R., 'Monolith formation and ring-stain suppression in low-pressure evaporation of poly(ethylene oxide) droplets', *J. Fluid Mech.*, 695, 321-329, 2012.
12. Askounis A., Sefiane, K., Koutsos V., Shanahan M.E.R., 'Structural transitions in a ring stain created at the contact line of evaporating nanosuspension drops', *Phys. Rev. E*, 87, 012301 (8pp) 2013.
13. Evidence for TiON sputtered surfaces showing accelerated antibacterial activity under solar irradiation Sami Rtimi, Cesar Pulgarin, Michael Bensimon, John Kiwi, *Solar En.*, 2013, 93, 55-62.
14. Accelerated bacterial inactivation obtained by HIPIMS sputtered films deposited on surfaces with concomitant reduction in the metal/semiconductor content. Sami Rtimi, Cesar Pulgarin, Oualid Baghriche and John Kiwi, *RSC Advances*, accepted
15. TaON and TaON/Ag co-sputtered surfaces under visible light irradiation leading to E. coli interfacial charge transfer (IFTC) implications. S. Rtimi, C. Pulgarin, R. Sanjines, J-C. Lavanchy, J. Kiwi, *J. Hazardous Mat*, accepted
16. Cu, Cu/TiO₂ Thin Films Sputtered by up to Date Methods on Non-Thermal Thin Resistant Substrates Leading to Bacterial Inactivation, J. Kiwi, S. Rtimi, C. Pulgarin, *Formatex Microbiology Series No 4*, 2013: Microbial pathogens and strategies for combating them: science, technology and education, in press
17. V.B. Fainerman, S.V. Lylyk, N.M. Kovalchuk, V.I. Kovalchuk, E.V. Aksenenko, J.T. Petkov and R. Miller, Effect of water hardness on surface tension and dilational visco-elasticity of sodium dodecyl sulphate solutions, *J. Colloid Interface Sci.*, 377 (2012) 1–6.
18. A. Javadi, J. Krägel, M. Karbaschi, J.Y. Won, A. Dan, A.V. Makievski, G. Loglio, L. Liggieri, F. Ravera, N.M. Kovalchuk, V.I. Kovalchuk and R. Miller, Capillary pressure experiments with single drops, in "Progress in Colloid Interface Science", Vol. 4, P. Kralchevsky, R. Miller and F. Ravera (Eds.), 2013, Chapter 13, p. 271-312.
19. E. Guzman, E. Santini, L. Liggieri, F. Ravera, G. Loglio J. Krägel, A. Maestro, R.G. Rubio, D. Grigoriev and R. Miller, Particle-surfactant interaction at liquid interfaces, in "Progress in Colloid Interface Science", Vol. 4, P. Kralchevsky, R. Miller and F. Ravera (Eds.), 2013, Chapter 4, p. 77-109.
20. E. Malysa, J. Zawala, K. Malysa, "A sensitive and simple method for controlling concentration of flotation reagents in waters of the coal processing plants" - manuscript submitted for presentation

- at 17th International Coal Preparation Congress-2013 (ICPC 2013) in Turkey
21. Interfacial Layers from the Protein HFBII Hydrophobin: Dynamic Surface Tension, Dilatational Elasticity and Relaxation Times. N.A. Alexandrov, K.G. Marinova, T.D. Gurkov, K.D. Danov, P.A. Kralchevsky, S.D. Stoyanov, T.B.J. Blijdenstein, L.N. Arnaudov, E.G. Pelan, A. Lips, *J. Colloid Interface Sci.* 376 (2012) 296-306.
 22. Co-Adsorption of the Proteins β -Casein and BSA in Relation to the Stability of Thin Liquid Films and Foams" K.G. Marinova, R.D. Stanimirova, M.T. Georgiev, N.A. Alexandrov, E.S. Basheva, P.A. Kralchevsky, Chapter 18 in *Colloid and Interface Chemistry for Nanotechnology*, Taylor & Francis, Boca Raton, FL, 2013, in press
 23. Cardiomyocyte Differentiation of Embryonic Stem Cells on the Surface of Organic Semiconductors Sergio Caserta, Mario Barra, Genesia Manganeli, Giovanna Tomaiuolo, Stefania Filosa, Antonio Cassinese, Stefano Guido. *International Journal of Artificial Organs*, in press.
 24. Abi Chebel N., Vejražka J., Masbernat O., Risso F.: Shape Oscillations of an Oil Drop Rising in Water: Effect of Surface Contamination. *J. Fluid Mech.* 702, 533-542 (2012).
 25. Hubička M., Basařová P., Vejražka J.: Collision of a Small Rising Bubble with a Large Falling Particle. *Int. J. Miner. Process.* 121, 21-30 (2013).
 26. KRESE, Blaž, GOVEKAR, Edvard. Nonlinear analysis of laser droplet generation by means of 0-1 test for chaos. *Nonlinear dyn.*, 2012, vol. 67, no. 3, pp. 2101-2109, doi: 10.1007/s11071-011-0132-1.
 27. JEROMEN, Andrej, GOVEKAR, Edvard. Modelling of resonant droplet detachment in laser metal droplet generation. *Physics procedia*, 2012, vol. 39, pp. 863-871, doi: 10.1016/j.phpro.2012.10.111.
 28. Peters, B., *The Extended Discrete Element Method (XDEM) for Multi-Physics Applications*, submitted.
 29. Referenced Performance study of the Drop Technology TLDA Microvolume Spectrophotometer Measurement Science & Technology (IOPP, Bristol) authors include N.D. McMillan.
 30. N. Kiss, G. Brenn, D. Suzzi, St. Scheler, H. Jennewein, J. Wieser, J. Khinast: The influence of process parameters on the properties of PLGA-microparticles produced by the emulsion extraction method. *AIChE J.* 590, 1868–1881 (2013).
 31. G. Brenn, St. Teichtmeister: Linear shape oscillations and polymeric time scales of viscoelastic drops. Submitted for review to *J. Fluid Mech.*, July 2012
 32. G.V. Li, E.V. Astrova, Y.A. Zharova, S.A. Dyakov, A.V. Baldycheva, T.S. Perova "Tunable Micro-cavity Based on Macro-porous Si: Feasibility of Fabrication", *IEEE JLT*, v.31 (2013).
 33. V. Tolmachev, K. Berwick, T.S. Perova, "The influence of light beam convergence on the stop-bands of a one-dimensional photonic crystal", *PIER*, vol. 140 (2013).

Annex III List of STSM during the 1st year of the MP1106 Action

Name	Sending Institute	Host Institute	Title	Time	Budget	Results
Ms Virginie Papadopoulou	Imperial College London,London UK	Aristotle University of Thessaloniki,Thessaloniki, Greece	Investigation of bubble formation and growth on tissues during decompression	03.11.2012 to 21.12.2012	1.500 €	Completed
Ms Lucie Vobecka	Institute of Chemical Process Fundamentals, Czech republic	Max Planck Institute of Colloids and Interfaces,Postdam(DE),	Measurements of interfacial properties of terpeneol solution	02.12.2012 to 14.12.2012	1.190 €	Completed
Dr Jürgen Krägel	Max Planck Institute of Colloids and Interfaces,Potsdam-Golm(DE)	Universite Paul Cesanne d'Aix Marseille III,Marseille(FR),	Tomographic microscopy of emulsions	06.01.2013 to 20.01.2013	1.500 €	Completed
Mr Mohsen Karbaschi	Max Planck Institute of Colloids and Interfaces,Potsdam-Golm(DE)	Statoil ASA,Porsgrunn,Porsgrunn(NO),	Droplet coalescence in Oil-Water systems, concentrated emulsions and instabilities	07.12.2012 to 31.01.2013	2.500 €	Completed
Dr Marcel Krzan	Jerzy Haber Institute of Catalysis and Surface Chemistry,Cracow (PL)	GRASP Group for Research and Application in Statistical Physics, Institut de Physique, Liege Univ. BE	Foamability of bio-surfactants based foams	09.01.2013 to 02.02.2013	2.200 €	Completed
Ms Maria Vlachou	Aristotle University of Thessaloniki,Thessaloniki(EL)	Technische Universität Darmstadt,Darmstadt(DE),	Determination of critical parameters of flow boiling	20.01.2013 to 26.01.2013	900 €	Completed
Dr Viorel Vasile Nastasa	National Institute for Laser Plasma and Radiation Physics,Magurele(RO)	Aristotle University of Thessaloniki, Department of Chemistry, Technology, Thessaloniki(EL)	Studies on the generation and stability of foams containing Polydocanol	31.03.2013 to 28.04.2013	2.250 €	Completed
Ms Agota Simon	National Institute for Laser Plasma and Radiation Physics,Magurele(RO)	Engineering for Smart Materials, Faculty of Engineering Technology, Enschede, NL	The interaction of solutions with medicine exposed to laser radiation with different surfaces	28.04.2013 to 26.05.2013	2.200 €	Completed
Dr Cornelis van der Geld	Eindhoven University of Technology,Eindhoven(NL)	Institute of Chemical Process Fundamentals,Prague(CZ),	Bubble shape oscillations of pinned bubbles	28.04.2013 to 10.05.2013	1300 €	Completed
Dr Konstantinos Samaras	Aristotle University of Thessaloniki,Thessaloniki(EL)	Univeristy of Thessaly,Volos(EL),	Measurement techniques of two-phase flow characteristics in pipes	13.05.2013 to 31.05.2013	1.500 €	Completed
Total	10				17040 €	

Annex IV

Dissemination Report for the 1st year of the Action

During the first year of the network, an active website for exchange of information and for making public the action activity has been created – see the address:

<http://cost-mp1106.lcpe.uni-sofia.bg/>

This site contains a brief description of MP1106 scope, link to the detailed presentation of the action aims, structure, research and application areas, and sub-domains for:

- Management Committee (list with complete information and e-mail addresses)
- Participants (complete list by countries)
- Workgroups (lists of members, with WG leaders and their e-mail addresses)
- Events (separated for each year with links to the specific event activities and information)
- Jobs (with description)
- Publications by the action participants (with links to the original papers)
- Core Group members with their contacts

The information on the web-site is updated very regularly, with the Minutes of all meetings of the MC being included, along with all important presentations of the various meetings and other relevant information. The time between the request for uploading given new information and its appearance on the web-site is several days (in most cases 1-2 days).

In addition, a system of distribution of messages to all participants in the action was created and used regularly to send information about the forthcoming events and about open positions in the participating institutions. The system is convenient, because anyone could send a message to the e-mail address: cost-mp1106@lists.dce.uni-sofia.bg.

After approval by the Dissemination manager, this message is distributed to the participants and the replies are received by the sender of the message, thus ensuring direct contact between the interested partners.

All suggestions for changes in the web-site have been discussed and all requests that found support by the Core Group members so far have been implemented.

N. Denkov, Dissemination Manager

Annex V

Gender Balance Activities Report for the 1st year of the Action

The memorandum of understanding contains a clear statement concerning promotion of gender balance in the framework of the COST Action MP1106: „This COST Action will respect an appropriate gender balance in all its activities and the Management Committee will place this as a standard item on all its MC agendas.” The following measures have been planned:

1. “All of the groups of the Action will be encouraged to promote the involvement of female professionals during the following activities: (i) selection of new research recruits (e.g. by hiring female undergraduate students), (ii) selection of personnel for short-term scientific missions, (iii) selection of personnel to attend scientific conferences”. This measure has been successfully fulfilled. Till March 2013 75% of all ESRs participating at STSMs have been female.
2. “Female participants will be encouraged to take part to the MC and lead the WGs”. 23% of MC members are female. Prof. Victoria Dutschk (The Netherlands) leads WG2.
3. “An MC member will be specifically appointed for taking responsibility of gender balance issues”. Dr. Gambaryan-Roisman (Germany) has been appointed to be responsible for gender balance issues.
4. “Facilitate participation of females to attend the Action conference/workshops and training schools. For instance, preference for hosts with available children care will be adopted to facilitate participation of mothers accompanied by children”. The action conferences and workshops which took place in the reporting period were attended by a large number of female scientists. The exact percentage of female representatives is unavailable.

A presentation on gender balance activities has been given by Dr. Gambaryan-Roisman during the 1st Annual Workshop Meeting (13-14.09.12, Dublin). A special session devoted to gender balance in European science has been organized during the Workshop “Smart and Green Interfaces” (21-22.03.13, Prague). The session included two presentations and a discussion. Dr. Gambaryan-Roisman has made a presentation “Gender balance and targeted activities in Germany”, in which the problem of disproportion of men and women in German and European scientific systems has been addressed. The gender imbalance is highest at the highest posts available in scientific system (full professor). The measures to combat this imbalance in Germany have been presented. A special focus has been made on the mentoring programs in Hesse. The next speaker was Prof. Dutschk presenting the targeted gender balance measures at the University of Twente in the framework of FFNT Female Faculty Network Twente. The major aim of the network is “raising gender awareness and promoting academic professionalism and leadership at UT to ensure a quality of a gender balanced organization”. The speakers reflected about the reasons of lacking the women at top leadership positions, including the role of society which stimulates gender differences through socialization and education, the fact that the women do not learn to compete, different communication and self-presentation style of females, different socialization of females in early years, high degree of self-criticism and, of course, the men-dominated search committees. The speakers and the other meeting participants discussed the additional measures which can be taken by COST Action MP1106 in the following years towards achievement of gender balance. This includes gender-specific training measures (i.e. in the framework of training schools) on communication, carrier planning, work-life balance; outreach activities directed towards female school pupils, mentoring and placing the links to specific female networks or specific programs on the Action web site. For example, it is expected that the gender aspect will be reinforced in the upcoming Career development/Entrepreneurship Training School (16-19.07.13, Thessaloniki).

T. Gambaryan-Roisman, Gender Balance Coordinator

Annex VI

Report on Results of questionnaire on Commercialization, IP and related matters

The Workgroup conducted a survey of all the partners of the MP1106 Action on their views and activities on commercialisation, IP and related matters. Somewhat surprisingly, three quarters of the respondents were interested in commercialising their research and more than a third had already had success in commercialising a technology or process. Gratifyingly the majority of MP1106 partners were involved in commercialisation in teams and felt their knowledge of these issues were inadequate. This will enable the WG4 activities to be fruitful. The report identified the profile of members as related to these issues, but more importantly the partner's deficiencies, interests and ambitions. An Executive Report will be written for the Chair to present to the Annual Progress Conference of the MNPS Domain will be held on 10-11 September 2013 at Reykjavik, Iceland and a full report will be produced to inform the members of all the Action of the 'Ground-zero' for the Action. The workgroup 4 has according to the official website 33 members but the questionnaire reveals a membership of 46 partners.

The report will be used to define the activities of the workgroup going forward and usefully it has been revealed that several partners have considerable and relevant experience with regard to commercialisation; partners have been identified who could contribute to WG4 activities to help develop the knowledge, capabilities and commercial prospects of others in the Action. From here, it is hoped decisions can be made on what activities WG4 will undertake and a core group of partners who are wishing to take a leading role in the workgroup have been identified. It is vital for MP1106 partners to agree exactly what the interpretation of the Questionnaire delivers, but perhaps some important initial findings/activities/issues coming are:-

- (i) It was felt by MP1106 respondents that to develop plans for European and international collaboration on commercialization are of central importance; process and instrument commercialization is favored; stages of commercialization is believed to be important; team work in commercialization is vital; group discussions on IP would be useful; networking sessions on IP could provide concrete assistance to partners; 60% feel they would like more help with commercialization; 70% hope to improve their understanding on how to raise funds for commercialization; developing knowledge of how to link SME and large companies is useful; and finally help to improve the partner's effectiveness and to create tailor made new technologies by an interdisciplinary network would be a desired outcome.
- (ii) The breakdown with suggestions on what activities WG4 should concentrate on are as follows (i) Help with obtaining patent/trademarks 13% (ii) Workshops 23% (iii) Conference 12%; Interactive training and certification 8% (iv) Confidential input from experienced commercialisers 13% (v) Commercial partnering 16% (vi) Help with funding for commercialisation 15%.

A second specific survey of all the workgroup 4 membership was conducted and this report has revealed a low level of activity with regards to intellectual property and commercialisation which is an important finding amongst WG4 partners. The WG4 is specifically charged with developing activities to improve and enlarge these commercialisation capabilities of partners.

The results of this survey are to the questions as to the activities of the WG4 academic partners as the industrial partners are of necessity involved in commercial activities.

- (i) Have you taken out a patent since the Action began or if you have prepared to take out such a patent? 3%
- (ii) Have you taken out trademarks? 0%
- (iii) Have you been involved in commercialising any product, process or software? 3%
- (iv) Have you managed work leading to commercialisation? 3%
- (v) Have you been involved in consultancy? 6%
- (vi) Have you written any papers with a commercial content? 3%
- (vii) Have you written any technical documentation for a product, process or software? 3%
- (viii) Have you helped or written any advertisements/web sales or for products, processes or software 9%

(ix) Have you written any technical articles in trade magazines, technical website? 9%

(x) Have you led or been involved in any marketing campaign for products, processes or software? 6%

This initial survey in 2013 establishes a waterline that will most definitely be used to measure the effectiveness of the activities of the WG4 over the period of the project on the members of the workgroup. Some of the above activities, such as writing technical articles in trade magazines, were done by industrial partners, which mean questions to individuals should have been rephrased to ensure a wider response. The WG4 membership is approximately 25% drawn from industry so that shows there is a very large divide between the experience of those in the workgroup from industry and academia. Whatever, the results show a very low involvement in the academic partners.

The author of this report has undertaken the task of sounding out as many partners as possible at the recent Prague meeting in March 2013 and has from these soundings made a proposal to run a Workshop on 'New Approaches and Support for Academics and SME for Commercialisation'. This proposal had four elements namely presenting the business theory to understand the process of commercialisation; activities of complementors in commercialisation; exploring roles of multinationals; and finally a significant exploration of what partners required as outcomes of this workshop. The COST MP1102 on Chemical imaging by Coherent Raman microscopy – microCoR have responded positively to a join activity and the details will now be worked on to firm up the proposal as this is the first outcome of the questionnaire that was issued at the start of the MP1106 Action and responds to demands coming from the broad membership of the Action.

The conclusion to be drawn from the preparatory work on behalf of workgroup 4 is there is a serious job of work here required to connect up the academic research community with the fellows in industry.

Norman McMillan, Commercialization Co-Manager

Annex VII

Cooperation with teams of this COST action apart from STSMs

1. Rising bubble experiments are performed with the group of K. Malysa in Krakow (Miller DE)
2. Krakow team (Malysa PL) with Golm team (Miller DE)
3. Krakow team (Malysa PL) with Liege team (Dorbolo BE)
4. Krakow team (Malysa PL) with Sofia team (Exerova, Mileva BG)
5. Krakow team (Malysa PL) with IWRI Australia team (Krasowska AU)
6. Cooperation with Unilever NL and Kruess DE (Marinova BG)
7. David Fairhurst UK, Martin Shanahan FR and Sefiane UK on droplet evaporation
8. David Fairhurst UK and Bob Pugh CH on foam stability
9. Victoria Dutschk NL and Jaroslav Katona RS on a new multidisciplinary consortium 'Inkjet printing'
10. -Victoria Dutschk NL and Zoran Šaponjic RS and COST CM1101 on nano-functionalization of textile materials
11. A fruitful cooperation with physicians and biologists lead to interesting results on electric active biocompatible surfaces to be used as biosensor (Guido IT)
12. Food model systems characterization (Navarini, Karapantsios; Guido; Liggieri, Langevin)
13. Bernhard Peters LU, with Luciano Navarini, Illy café, IT and Alidad Amirfazli CA.
14. Cees v.d. Geld NL with the AMC (Amsterdam Medical Center) and EMC (Erasmus Medical Center) concerning boiling in blood as occurring in endovenous laser treatment.
15. Cees v.d. Geld NL with Bronkhorst B.V. and TNO leading to a STW proposal for scientific research with financial support of various industrial partners.
16. Cees v.d. Geld NL with Océ on the topic of evaporating droplets on a porous substrate.
17. Karapantsios GR with School of Veterinary Medicine (AUTH) for sensing bubbles in anesthetized pigs.
18. Katona RS with UPS and IFP Energies Nouvelles
19. Sefiane UK with Shanahan FR on droplet evaporation
20. Koutsos UK with Karapantsios GR on nanoparticles surface characterization
21. Langevin FR with ULB on Thin liquid films
22. Langevin FR with IFP Energies Nouvelles on Enhanced Oil Recovery
23. Langevin FR with ULiege on Foams in Microgravity
24. P Colinet BE with IMFT – Toulouse (Colin, Legendre) and University of Thessaloniki (Karapantsios) on desorption of gases from liquids by boiling, applications in heat transfer and in greenhouse gases regeneration. STSM planned.
25. M. Antoni FR with R. Miller DE on pickering emulsions and interfacial rheology
26. M. Antoni FR with K. Sefiane UK on nanofluid droplet evaporation
27. G. McHale UK with N. Shirtcliffe DE and K. Sefiane UK

Annex VIII

Report on Round Table Discussions and Thematic Cluster formation

During the Annual Workshop in Prague, following the decision taken in the Dublin meeting in September 2012, three Round Tables (RT) were organized concerning the topics:

1) Food, Biotechnology and Biomedical

2) Energy and Environment

3) Nanotechnology and Nanoscience

The main goal of the RT was to nucleate around specific subtopics a limited number of small clusters of members of the action, which could be active in proposing ideas useful to participate actively in the forthcoming EU calls.

To stimulate the discussion, a general introductory presentation to the RTs was given to the meeting participants, mentioning some of the initiatives recently proposed by the European Commission, such as the Knowledge and Innovation Communities (KIC) and the European Innovation Partnerships (EIP). The general structure of the forthcoming HORIZON 2020 program was also described in a dedicated presentation.

For each RT two moderators were selected, one from industry and one from academia, with the aim of putting together topics of interest for industrial applications and thus capable to attract industrial participation on one hand, and try to connect industrial applications to more fundamental research on the other.

A short summary, reported in the following, was edited by the three academic coordinators in order to briefly describe the main results of the discussions.

The three discussions had a wide and active participation that led to fruitful and interesting results. During each section a certain number of potential clusters was identified and subject to voting in order to estimate the number of interested participants (reported in bracket in the following lists). In some cases candidates were also identified for the coordination. The overall number of proposed topics and cluster candidates is 16.

It was decided that an e-mail to all COST members will be sent after the workshop asking to express an interest in topics which have already attracted attention during the RT discussion. On the basis of the number of interested people, the Core Group of the Action will decide about the clusters to activate, nominating the respective chairpersons proposing specific meetings during fall 2013. These clusters should primarily work at focusing more specifically the targeted subject(s).

Food, Biotechnology and Biomedical

Moderators: Simeon Stoyanov, University of Wageningen/ Unilever R&D, The Netherlands
Libero Liggieri, CNR-Institute, Italy

The proposed topics are quite large and offer several connections with Smart and Green Interfaces. Advanced Medicine (nanomedicine, new diagnostics & therapies) and Efficient production (Raw materials, energy-effective) are important keywords of the Horizon 2020 program.

As far as biotechnology and biomedicine are concerned, a multidisciplinary approach is a mandatory requirement to be successful in such process. It is therefore necessary to involve competences from biology, medicine and pharmaceuticals. Concerning the multidisciplinary issues, it could be useful to check if there are common points to Actions in other COST Domains (Biomedicine and Molecular Biosciences, Food and Agriculture...).

The following list of topics has been proposed:

1. Medical diagnostics & advanced therapies (16)
 - Functionalised particles
 - Biocompatibility
 - Microfluidic devices
 - Biomedical
 - Tissue eng.: interaction of cells with matrix
2. Drug delivery - (20)
 - Capsules & functionalised particles
 - Aerosols

- Biocompatibility
 - Targeting and in-situ drugs activation
3. Raw materials from biomasses - (17)
- Surface science for chemical technologies and processes
 - Smarter ways to use Biomass
 - Alternatively derived proteins
 - Surface active bio-molecules (Biosurfactants / proteins)
 - Multiphasic flows
4. Food Science and Technology - (27)
- Emulsions & Foams
 - Alternatively derived proteins
5. Energy efficiency in food product processing - (22)
- Smart power (heating / cooling)
 - Smart emulsification/de-emulsification
6. Downstream processing - (20)
- Smart separation
 - Fermentation
 - Extraction

Some of these topics will be discussed in meetings hosted at the joint workshop with ECIS in September.

Energy/Environment round table

Moderators: C.W.M. van der Geld, Eindhoven Univ.TheNetherlands
N. Lestos.Hephaestus B. M. & Eng. SA, Greece

The three main categories defined in the previous round table discussion, in Dublin, are:Liquid-liquid interfaces; Gas-liquid interfaces; Liquid-gas-solid interfaces. These three categories have surfactants, foams, electric fields, de-foaming and solid foams in common, and each theme comprises quite some well-defined topics (see the report of the Dublin round table discussion),most of which can easily be characterized as green and smart. Examples are particle-coated drops, rapid prototyping.

The list of topics was shown on the screen during the RT discussion in Prague and the audience was stimulated to define concrete topics to be worked on in subgroups of the participants of the COST Action MP1106.

The defining of topics went fluently and several attendees volunteered to organize a dedicated meeting.

7. Heat and mass transfer to a fluid on a solid substrate (21)
- CFD of free interfaces across which heat and mass transfer takes place.

MickaëlAntoni of Aix-Marseille Univ. and KhellilSefiane of the Univ. of Edinburgh volunteered to organize a workshop

8. Wetting of complex surfaces (22)
- Contact line motion
 - Coatings
 - Pinning

Tatiana Gambaryan-Roisman is in the process of organizing a workshop on this topic and the organization can be extended in order to encompass the COST action MP1106 in the way described above

9. Heat transfer with phase change (12)

Flow pattern maps with heat transfer, f.e. in evaporator tubes

10. Increase of safety and energy efficiency in heat and mass transfer processes. (12)

N. Lestos volunteered to organize a workshop

11. Energy-efficient methods to produce emulsions and foams (22)
- Drop break-up
 - Oil-water separation
12. Wettability of surfaces in the context of pool boiling and flow boiling (10)

13. New materials with superb thermal and sound insulation properties, **(6)**

- f.e. based on nanopockets and for use in construction of buildings.

Nanotechnology and Nanoscience round table

Moderators: T. Gambaryan-Roisman (Technische Universität Darmstadt);

C. Koukiotis (Loufakis Chemicals SA)

The lists of topics from the round table during previous meeting in September 2012 in Dublin and the topics proposed during the actual round table have been shown on the screen.

The topics proposed during the meeting in Dublin were: i) Hydrogen production by biocatalysts; ii) Heavy metals reduction; iii) Controlling self-assembly for sensing devices; iv) Fibers as sensors; v) Using natural surfactants for self-assembly of nanofibers. The following discussion has revealed that the items (iii) and (iv) belong to the new formulated topics. The audience was suggested to define new topics of interest, which after a discussion have been organized into three fields:

14. Nanocomposite materials: fabrication, characterization **(20+16+12)**

Patterned surfaces for sensing devices

Nanoparticles on textiles and nanoparticles on thin polymer films

Nanocomposites based on nanofibers, improvement of adhesion to matrix

Nanocomposites based on nanoparticles and polymers (not voted separately)

15. Nanoparticles and nanocomposites for stabilizing dispersed systems **(16)**

liquid marbles

pickering emulsions

Bubbles and drops for assembling of nanoparticles and fabrication of nanocomposites and porous materials with and without external stimuli

16. Nanoparticles and graphene oxides and their applications **(4)**

Membranes

Water desalination

It has been stressed that each topic should address fabrication and characterization of nanoparticles and hazard analysis (toxicity also in mixture and dispersion).

Sergio Caserta, IP Co-Manager