

# PROJECT FINAL REPORT

**Grant Agreement number: 229801**

**Project acronym: T - POT**

**Project title: Unlocking the Croatian Textile Research Potentials**

**Funding Scheme: CSA**

**Period covered: from 02/03/2009 to 29/02/2012**

**Name, title and organisation of the scientific representative of the project's coordinator<sup>1</sup>:**

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<sup>1</sup> Usually the contact person of the coordinator as specified in Art. 8.1. of the Grant Agreement .

<sup>2</sup> The home page of the website should contain the generic European flag and the FP7 logo which are available in electronic format at the Europa website (logo of the European flag: [http://europa.eu/abc/symbols/emblem/index\\_en.htm](http://europa.eu/abc/symbols/emblem/index_en.htm) logo of the 7th FP: [http://ec.europa.eu/research/fp7/index\\_en.cfm?pg=logos](http://ec.europa.eu/research/fp7/index_en.cfm?pg=logos)). The area of activity of the project should also be mentioned.

## 1.1. Final publishable summary report

The summary consists of 5 distinct parts:

- 1.1.1. Executive summary
- 1.1.2. A summary description of project context and objectives
- 1.1.3. A description of the main S&T results/foregrounds
- 1.1.4. The potential impact (including the socio-economic impact and the wider societal implications) and the main dissemination activities and exploitation of the results
- 1.1.5. The address of the project public website

### 1.1.1. An executive summary (1 page)



University of  
Zagreb



Faculty of  
Textile  
Technology



T-Pot project  
229801



FP7-REGPOT-  
2008-1

## Unlocking the Croatian Textile Research Potentials Grant agreement 229801

T-Pot aims to reinforce research potentials of the Faculty of Textile Technology of the University of Zagreb (TTF) in order to strengthen the university sector to become one of the components of the national innovation system in Croatia. The goals are to develop the capacity for breakthrough research, leading to innovative textile and textile related products, contributing in this way to the local industry, both nationally and in the region.

The overall objective of T-Pot is to *unlock and upgrade the research potential* of the Faculty of Textile Technology (TTF), particularly its *Textile Science Research Centre*, enabling enhanced participation of Croatian textile organisations in research activities at the European level, in order to support the harmonisation and integration process of Croatian textile entities into the European Research Area.

The reinforcement of TTF's research potentials is done through the reinforcement of human and material potential, as well as the research infrastructure. The recently established Textile Science Research Centre is upgraded to become one of the components of the national innovation. Top scientists are attracted to the country for exchange of know-how and guidance of Croatian textile manufacturers. That is why *T-Pot addresses all major issues* of improvement of research capacities, addressed in FP7 Capacities Work Programme: Research Potential, as topics for REGPOT-2008-1:

1. Reinforcement of S&T potential
2. Developing strategic partnerships with well established research groups
3. Supporting and mobilising the human & material resources
4. Facilitating communication between the centres having similar scientific interest
5. Disseminating scientific information and research results
6. Improving the responses to socio-economic needs (of Croatia).

### 1.1.2. A summary description of project context and objectives (4 pages)

All objectives envisaged to be carried out during the project lifetime have been successfully completed and all tasks have been concluded.

<b>WP1: Management</b>
<b>T.1.1</b> Organisation of periodical meetings <ul style="list-style-type: none"><li>▪ meetings of the Management Board (kick-off, progress meetings every 6 months)</li><li>▪ meetings of the Management Team (progress meetings once per month)</li></ul>
<b>T.1.2</b> Contract administration
<b>T.1.3</b> Financial administration
<b>T.1.4</b> Project reporting (Midterm and Final reports)

The management team performed all envisaged tasks timely and in accordance with the best practices. Effective project management procedures were detailed in Project Handbook (D.1.1). Operational board meet on a regular monthly basis to discuss current project issues and manage possible changes while Management board held regular 6 months based meetings. The quality assurance was controlled by constant monitoring of execution, reaching of milestones as well as producing of deliverables on time.

<b>WP2: Developing strategic partnerships for know-how transfer</b>
<b>T.2.1</b> Initiating partnerships: with 3 Institutes (STFI, LEITAT and INFMP) and 1 SME (GZE). Additional partnership with EMPA and University of Ljubljana.
<b>T.2.2</b> PhD Employment and secondments: Employment of 3 young scientists. Total secondments duration: 16 months. <ul style="list-style-type: none"><li>○ Marina Turalija, 01.09.2009.-01.05.2010.; 01.07.2010.-01.08.2010.; 10.03.2011.-20.05.2011., EMPA, St. Gallen, Switzerland (13 monthths)</li><li>○ Eva Magovac, 19.11.2010.-19.12.2010, University of Ljubljana, Slovenia (1 month)</li><li>○ Zorana Kovačević, 18.10.2010.-18.12.2010., Institute of Natural Fibers and Medicinal Plants (INFMP), Poznan, Poland (2 months)</li></ul>
<b>T.2.3</b> Mentors know-how transfer (Visit of mentor to EMPA, INFMP and University of Ljubljana) <ul style="list-style-type: none"><li>○ Sandra Bischof Vukušić:</li><li>○ 16.11.-20.11.2009, EMPA, Department for Advanced Fibers, St. Gallen, Switzerland</li><li>○ 15 till 17 June 2010, INFMP</li><li>○ November 2010, University of Ljubljana, Ljubljana, Slovenia</li></ul>
<b>T.2.4</b> Research secondments, up to 6 months within EU borders. Total secondments duration: 4 months. <ul style="list-style-type: none"><li>○ Sanja Ercegović Ražić, from 16.06.2009.- 20.07.2009, LEITAT, Terassa, Spain (1 month)</li><li>○ Antoneta Tomljenović, from 28.02.2011.-18.03.2011, LEITAT, Terassa, Spain (1 month)</li><li>○ Vedran Đurašević, from 01.01.2011.-03.04.2011, University of Leeds, Colour Science Department, Leeds, UK (2 months)</li></ul>
<b>T.2.5</b> Research secondments, up to 2 weeks: Croatian scientists: <ul style="list-style-type: none"><li>○ Sandra Bischof Vukušić, 7.03.-27.03.2009, The University of Georgia, Textile Sciences, Dawson Hall, Athens, GA, USA (2 weeks)</li><li>○ Tihana Mikša Perković, 31.01.2010 – 06.02.2010, GZE, Italy (1 week)</li><li>○ Martinia Ira Glogar, 28.08.2011-03.09.2011, GZE, Italy, (1 week)</li></ul> EU scientists: <ul style="list-style-type: none"><li>○ Dr. Thomas Pfueller, 15.05.2011.-21.05.2011, STFI, Chemnitz, Germany (1 week)</li><li>○ Edyta Bogacz, 06.06.2011.-17.06.2011, INFMP, Poznan, Poland (2 weeks)</li><li>○ Moises Moron Soler, 18.02.2011.-26.02.2011, LEITAT, Terassa, Spain (1 week)</li></ul>
<b>T.2.6</b> Hosting scientists

- Prof. Charles Q. Yang, 27.10.2011-3.11.2011, University of Georgia, GA, USA
- Dr. Sabyaschi Gaan, 17-19.10.2011, EMPA, Switzerland
- Prof. David Hui, 5.5.2012-12.5.2012, University of New Orleans, USA.

### **WP3: Recruitment of experienced researchers (for know-how transfer and setting up of new research group)**

**T.3.3** Employment of Dr. Andrea Katović, University of Calabria, Italy, in two shifts:

- First shift 1.10.2009-1.3.2010 (5 months)
- Second shift 1.10.2010.-1.5.2011 (7 months).

### **WP4: Acquisition and upgrading of research equipment and setting up new laboratories**

**T.4.1-T.4.4** Acquisition of equipment (TGA, DSC, FTIR, SEM)

**T.4.5** Presentation of new laboratories at the following occasions:

- Opening ceremony: 25.02.2010.
- Workshop held by Prof. Charles Q. Yang on 2<sup>nd</sup> November 2011.
- 19<sup>th</sup> Annual Conference of Croatian Microscopy Society, held on 2<sup>nd</sup> December 2011.

### **WP5: Organisation of workshops and conferences**

**T.5.1** Training at partners premises – 3 in house 3-day trainings at LEITAT, STFI and INMFP. Additional workshop was held at GZE.

- Leitat (Terrassa, Spain) from 16 till 19 June 2009
- STFI (Chemnitz, Germany) from 29 November till 4 December 2009
- GZE (Montelupo, Italy) from 27<sup>th</sup>-28<sup>th</sup> May 2010.
- INFMP (Poznan, Poland) from 15 till 17 June 2010.

**T.5.2** Training organized by TTF in Croatia - 2 Workshops:

- Croatian Chamber of Economy (HGK): Innovation, 21-23.09.2009.
- Croatian Chamber of Trades and Crafts (HOK): Innovation management, 9 -11.05.2011.

**T.5.3** ITC&DC 2010 Conference – participation of all partnering institutions.

- 3-6.10.2010. Dubrovnik, Croatia

**T.5.4** Textile Science & Economy 2010 Symposium, 16.01.2010. Zagreb, Croatia.

○ organisation of symposium jointly with Croatian Chamber of Commerce and Croatian Employer's organisation. Participation of all partnering institutions at the Round table.

**T.5.5** Attendance at textile and related conferences:

- AATCC, ITC&DC, TS&E, TBIS, AUTEX

Attendance on numerous workshops.

**T.5.6** Dissemination Conference held in coordination with Croatian Chamber of Trades and Crafts, 16.02.2012.

### **WP6: Dissemination**

**T.6.1** Textile portal, <http://www.ts-rc.eu/>

**T.6.2** T-Pot project web site: <http://www.t-pot.eu/>

**T.6.3** STEP web site, <http://www.ttf.unizg.hr/step/about.htm>

**T.6.4** Postgraduate seminars, publication of book of scientific papers of young researchers: Young scientists in Protective Textiles Research (Ed. S. Bischof Vukušić, D. Katović), 2011.

<p><b>T.6.5</b> Textile forums:</p> <ul style="list-style-type: none"> <li>○ Ken Greeson, <i>Cotton Opportunities</i>, Cotton Incorporated, NC, USA</li> <li>○ Ljubica Česnik, <i>Safety &amp; Protection</i>, Du Pont International, Slovenia</li> <li>○ Dinka Liplin-Prpić, <i>Power of Innovation</i>, Schoeller Textiles, Switzerland</li> </ul>
<p><b>T.6.6</b> Presentations (TV, radio, annual conference etc.)</p> <ul style="list-style-type: none"> <li>○ Trenutak soznaje, HRT 1</li> <li>○ 18.02.2012. Obrtnik &amp; partner (Craftmen &amp; Partner), TV: HRT1</li> </ul>
<p><b>T.6.7</b> Printing and publishing (brochures, flyers, promo materials, conference proceedings etc.).</p> <p><b>Flyers:</b> T-Pot, TSRC, Scientific TSRC Laboratories</p> <p><b>Books:</b> ○ Young Scientists in Protective Textiles Research</p> <ul style="list-style-type: none"> <li>○ Functional Protective Textiles</li> <li>○ T-Pot Monography</li> </ul> <p><b>Conference Proceedings:</b> Textile Science &amp; Economy 2010</p>

### 1.1.3. A description of the main S&T results/foregrounds (25 pages)

#### WP2 – Strategic partnerships and know-how transfer

The main purpose of the WP2 is to develop strategic or twinning partnerships with related textile institutions. There are 3 objectives of WP2:

- formation of strategic partnerships focused on capacity building through know-how transfer
- sharing of research resources
- joint initiatives for developing services in support of business and innovation

#### T 2.1. Initiating partnerships

The aim of this task was to initiate new strategic partnerships with at least 3 but possibly more partnering institutions, in order to speed up integration of TTF and TRSC into ERA and broaden the knowledge base of TTF and entire Croatian scientific community in the second instance. STFI from Germany, Institute of Natural Fibers from Poland and LEITAT from Spain have already accepted TTF's request for partnership during the project preparation phase, so the formal agreement was signed at the time of the kick-off meeting in Zagreb.

Additionally, as planned in Annex 1, face-to-face visits to new partner institutions were organised, in order to establish further partnerships. The first visit was to GZE- Grado Zero Espace, Italy. In agreement with STFI, INMP and LEITAT, Grado Zero Espace, a research performing SME from Montelupo (Italy) is selected to be the new strategic partner, for its experience in EU programmes and solid research base. EMPA will be a hosting institution without the status of the partnering institution and participation on the project management board.

#### Face-to-face visit to GZE

Group of three Croatian T-Pot management Board members (Project coordinator Sandra Bischof Vukušić, Equipment Manager Tanja Pušić and Training Manager Edita Vujasinović), two German MB representatives (Petra Franitza and Romy Naumann) and Polish representative in MB (Malgorzata Zimniewska) have visited partnering institution Grado Zero Espace at their new premises at Montelupo, Italy on 28-29.05.2010.

T- Pot group visited factory Ponte Torto S.p.A., in Prato. After the visit, a new partner Grado Zero Espace have been successfully introduced and cooperation agreement have been signed.



**Figure 1:** T-Pot group with Quota zero jacket

### **Initiating partnership with EMPA**

EMPA was founded in 1880 in the cellars of Zurich`polytechnic University, the forerunner of ETH Zurich. Over more than 100 years of development, today EMPA is an interdisciplinary research and services institution for material sciences and technology development. Their research activities cover the following domain: Advanced Materials and Surfaces, Civil and Mechanical Engineering, Materials and Systems for the Protection & Wellbeing of the Body – Information, Reliability & Simulation Technology, Mobility, Energy and Environment.

The face-to face visit to EMPA, Swiss Federal laboratories for materials testing and research has been carried out on 17-19 November 2009. Ph.D Sandra Bischof Vukusic, Professor of University of Zagreb Faculty of Textile Technology visited EMPA's premises at St. Gallen as part of activities of T.2.1. Initiating a partnership and T.2.3. Mentors Know how transfer. The first task of the visit was to establish the research collaboration of TTF and EMPA. In the presence of members of Department for Advanced Fibers, Prof. Bischof Vukusic held three presentations:

- 1) Presentation of FP7-REGPOT-2008-1: T-Pot project
- 2) Presentation of TSRC Portal
- 3) Presentation of research topics within the project: Alternative Environmentally Friendly Processes and Methods of Cellulose Modification.

### **Initiation of partnership with the Institute for Adriatic Crops and Karst Reclamation**

Former cooperation with association Porart and Town museum Šibenik resulted with the new partnership and cooperation on the topic of preservation of cultural heritage and revitalisation of traditional crafts. Face to face visit of TTF's group to Split was performed during 7-11.9.2011. Result of this visit is project submitted to University of Zagreb Development Fund, which was accepted and started from 1<sup>st</sup> January 2012.

### **T 2.2. PhD student secondments**

**First research secondment at EMPA, Switzerland was carried by Marina Turalija.**

Dissertation topic, mentored by Prof. Bischof Vukušić (TTF) and Dr. Sabyasachi Gaan (EMPA), is entitled: Antimicrobial functionalization of polylactide polymers through bulk and plasma modification.



It is agreed between two organisations that the first part of experimental work would be performed at EMPA, St. Gallen under the supervision of Prof. Ghan, after which the research is going to continue at TTF, Zagreb. B.sc. Turalija spent altogether 13 months at EMPA, and last part of her stay was supported with the funds of Unity through knowledge, Gaining Experience Grant. More about this project is available at:

[http://www.ts-rc.eu/index.php?option=com\\_content&view=article&id=239&Itemid=83&lang=en](http://www.ts-rc.eu/index.php?option=com_content&view=article&id=239&Itemid=83&lang=en)

### **Second research secondment at University of Ljubljana, Slovenia was carried by Eva Magovac.**

University of Ljubljana

On 19<sup>th</sup> November 2010 she started her research secondment at the premises of University of Ljubljana, Faculty of Natural Science and Engineering, Department of Textile. During the one month secondment in Ljubljana Eva studied the effect of microencapsulated flame retardants on the flammability and thermal stability of fabrics under supervision of Prof. Petra Forte Tavcar, PhD.



The microcapsules have been developed by AERO, Chemical, Graphic and Paper Manufacturers, d.d. Celje, Slovenia. The company deals with a wide range of paper and paper based materials; from repositionable products, self-adhesive materials for label industry to self-adhesive tapes, colours and glues, as well as microencapsulated products and is one of the oldest in this part of Europe for such kind of products. ([http://www.aero.si/ps/index\\_engl.htm](http://www.aero.si/ps/index_engl.htm))

### **Third research secondment at Institute of Natural Fibers and Medicinal Plants, Poland was carried by Zorana Kovačević.**

During the two months secondment at INFMP (18<sup>th</sup> October – 15<sup>th</sup> December 2010), Zorana Kovačević has studied the different methods of Spanish Broom plant maceration (water retting, osmotic degumming and enzymatic treatment) as well as physical properties of obtained fibres under the supervision of Dr. Malgorzata Zimniewska, Head of Department of Textile Technology and The Laboratory of Physiological Influence of Textiles on Human Body.



Figure 2: Dr. M. Zimniewska and her team

### **T.2.3. Mentors know-how transfer**

As part of the activities of T 2.3. prof. Sandra Bischof Vukušić visited EMPA and successfully completed first transfer. Prof. Bischof Vukusic discussed the research topic of the Ph.D thesis of Marina Turalija, who was on the research secondment at EMPA. Her supervisor of research work was Dr. Sabyasachi Gaan. PhD is entitled: Antimicrobial functionalization of polylactide polymers through bulk and plasma modification. Public defence of the Disertation topic was held on 17<sup>th</sup> February 2012, at the presence of Prof. Bischof Vukusic and Dr. Gaan.



**Figure 3:** Dr. Sabyasachi Gann and PhD candidate Marina Turalija

Second know-how transfer was to INFMP (Dr. Malgorzata Zimniewska) where Zorana Kovačević was on her research secondment during the winter 2010.

Third know-how transfer was to University of Ljubljana (Prof. Petra Forte Tavčer) where Eva Magovac was on her research secondment in duration of one month.

#### **T.2.4. Up to 6 months secondments**

Two research secondments were executed, to partner institution the LEITAT in Spain. The secondees were Ms. Sanja Ercegović Ražić, from 16.06.2009 - 20.07.2009 and Dr. Antoneta Tomljenović, from 28.02.2011-18.03.2011.

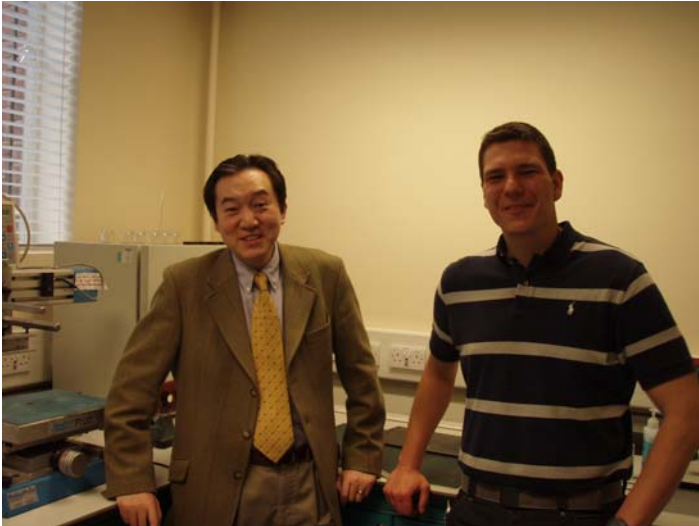


**Figure 4:** Sanja Ercegović Ražić, Jordi Mota and Laia Crespo, Ph.D: Surface Treatments Unit in physical-chemical laboratory for R&D



**Figure 5:** Dr. Antoneta Tomljenović at the new headquarters building.





Third secondment was executed by Vedran Đurašević, from 01.01.2011-03.04.2011 who visited colour Science Department of University of Leeds, UK.

**Figure 6:** Research secondment at University of Leeds. PhD candidate Vedran Đurašević and his mentor Prof. Ling

### **T.2.5. 2 week secondments:**

The execution of majority of secondments is postponed to the second project period due to delays that occurred in WP4, equipment acquisition. Only one short research secondment was executed within the first period. Prof. Sandra Bischof Vukušić visited Textile Sciences Department of The University of Georgia, GA, USA in the period 1.3.2009-20.03.2009.

Two designers from TTF: Tihana Mikša Perković and Martinia Ira Glogar visited Grado Zero Espace, both in duration of 1 week.



**Figure 7:** Research secondment of Dr Thoms Pfüller from STFI



**Figure 8:** Research secondment of Moises Moron from LEITAT

### **T 2.6. Hosting scientists:**

The following scientists have been chosen as hosting scientists, due to the previous collaboration or due to the broadening of the TTFs research to new directions.

1. Prof. Charles Q. Yang, 27.10.2011.-3.11.2011., The University of Georgia, GA, USA
2. Dr. Sabyasachi Gaan, 17-19.10.2011., EMPA, St. Gallen, Switzerland
3. Prof. David Hui, 5.5.2012.-12.05.2012., University of New Orleans, LA, USA.



**Figure 9:** Hosting scientist Prof. Charles Q. Yang from The Georgia University, GA, USA

### **T 2.7. Evaluation of results:**

The main results of WP2 are newly established strategic partnerships and new opportunities for cooperation of TTF's researchers to do the part of their research in international environment.

Initiation of partnership with already recognized R&D partners has improved knowledge base of TTF and TSRC through knowledge transfer and adoption of new research methods and technologies, and opened access to international knowledge base and skills to local economy. TTF and TSRC can now better respond to the needs of Croatian and regional textile sector offering broader spectrum of services, alone or jointly with strategic partners.

### **T.2.8. Sustainability of partnerships:**

A successful partnership included the following sustainability values to guide actions:

- Forming an internal sustainability team
- Conducting a facility operations assessment
- Defining topics/goals of joint interest:  
Topics: Technical textiles, Composites, Sustainable & green products, Functional finishing  
Goals: Joint scientific publication, accreditation of testing methods, partnership in EU projects
- Evaluating project options: EU or national funded R&D projects
- Setting objectives and developing plans
- Implementing plans and assessing programs
- Measuring successes.

By following these guidelines, new partners created motivating environment for long term partnership cooperation. The main contribution to the sustainability is given through creation of project pipeline and definition of long term joint research goals. One of the greatest benefits of individual partners is formation of T-pot Network and sharing lessons learned with other members.

## **WP3 – Recruitment of experienced researchers**

**The WP3 has 5 objectives:**

- raising the international competitiveness of TTF
- forming a strong regional centre
- reinforcing human capacities by recruiting experienced researchers
- knowledge of unique technologies transferred to TTF
- setting up new research directions leading to competitive advantage.

### **T.3.1 Prerequisites for integration**

- setting up measures and procedures to facilitate recruitment of experienced researchers
- formation/upgrade of laboratory
- setting up a research group for joint work.

Prior to entering the European Union Croatia has signed The European Charter for researchers and The Code of Conduct for the Recruitment of Researchers. University of Zagreb has signed this document on 11th March 2010. Upon formation of SEM laboratory, upgrading of Textile Science Research Laboratory, recruitment of experienced researcher and 3 PhD students, the research group was set. The experience of Prof Katović is of great importance for her new research group at the TTF.

### **T.3.2 Recruitment of an expert**

- announcing the need for recruitment of an expert worldwide
- choice of candidates, under The Code of Conduct for the Recruitment of Researchers
- organization of temporary employment
- dissemination of obtained results in papers and conferences

As a part of T 3.2. activities, TTF recruited prof. Andrea Katović, experienced researcher from Italy. Prof. Katović graduated in Chemistry in 1985 and received a Master of Science degree in Physical Chemistry and Radiochemistry in 1989 at the Faculty of Sciences and Mathematics, University of Zagreb. Her PhD thesis was accepted by the Scientific Council of the Ruđer Bošković Institute in 1990 and issued in 1991 by University of Zagreb. From 1985 till 1992 she was employed at the Rudjer Boskovic Institute at the Department of Nuclear Energy, first at the Technology and Protection Laboratory for Colloidal Chemistry and later at the Laboratory for Synthesis of New Materials.

Since 1993 she has been working at the University of Calabria (UNICAL). The University of Calabria (<http://www.unical.it>) is a medium-sized university with about 36.000 students situated in Southern Italy, is a public institution established in 1972. Her actual research activities comprise preparation and characterization of micro and mesoporous materials that are interesting for catalysis and adsorption as well as liquid phase heterogeneous catalysis with a special emphasis on ecosustainability of materials and processes.

Recruiting prof. Katović brought missing and much needed expertise to complement existing one at TTF, and enabled formation of new research group dealing with a topic not previously dealt with at TTF. By formation of new research group and purchasing of the equipment for thermal analysis and SEM within the framework of T-pot project, a process of creation of new nanotechnology research group at TTF is successfully completed.



**Figure 10:** Prof. Andrea Katović (left) with her new research group at the Faculty of Textile Technology, University of Zagreb

### **Significant results of WP3**

Activities of WP3 produced two significant results - an experienced researcher is employed and new research group mentored by a respective researcher is formed and successfully integrated into the TTF research environment. Additionally, procedures for short term employment and integration of experienced researchers have been improved, simplified and adopted as a new standard procedure. This initiative was a joint effort of the University of Zagreb, four REGPOT 2008 project coordinators, the Ministry of Science, Education and Sport and Agency for Mobility and EU programmes. Having in mind a Croatian scientific community recently fully opened to ERA, adopting standard practice for employment and integration of experienced researchers have had significant impact to all future mobility actions.

### **WP4 – Acquisition and upgrade of research equipment**

#### **Objectives of the WP4**

WP4 has five objectives:

- upgrading of research equipment for in-depth scientific investigations
- purchase and installation of equipment
- education of personnel in use of equipment
- creating flexible scientific research laboratories with modern equipment where groups of researchers can work on specific projects
- create conditions for cooperation with industry and joint projects

All tasks of WP4 envisaged to be carried out are successfully completed. All the equipment purchased under the WP 4 Acquisition & Upgrading of Research Equipment is located in two laboratories at the Department of Textile Chemistry & Ecology in Zagreb, Croatia, according to the plans presented in Grant Agreement.

#### **T 4.1. - T.4.3. Acquisition of the first set of the equipment (FTIR, DSC, TGA)**

The purchase of the first set of the equipment was performed under the Public procurement no. EVV-14/2009. The purchase contract no. 02-1851/2009 was signed on 15th October 2009 and the equipment was installed in January 2010.

#### **T.4.4. Acquisition of second set of the equipment (SEM, EDS, Sputter)**

The purchase of the second set of equipment was performed under the Public procurement no. EVV-5/2009. According to the Contract, the ordered model FE SEM Mira II LMU was installed at the premises of the Department of Textile Chemistry & Ecology, Faculty of Textile Technology, University of Zagreb in December 2009.

All the equipment is located in two laboratories at the Department of Textile Chemistry & Ecology:

- **Textile Science Research Laboratory:** DSC, FTIR with TG-IR interface and TGA, purchased from Perkin Elmer.

- **SEM Laboratory:** dedicated exclusively to SEM analyses. It was completely rearranged to obtain its best functionality. Following equipment was purchased: a) Microscope: **FE-SEM MIRA/LMU**, Tescan; b) EDS detector for the chemical analyses: **AXS Microanalysis Quantax**, Bruker; c) Sputtering device: **SC7620-CF Mini**, Quorum Technologies.



**Figure 11:** Textile Science Research Laboratory. Researchers: Eva Magovac and Sandra Bischof V.



**Figure 12:** SEM Laboratory. Researchers Eva Magovac and Zorana Kovačević

#### **Trainings for equipment operation:**

Two trainings were organized for each set of equipment: a basic level training immediately after the installation of the equipment, and an advanced level training 2-3 weeks after.

##### **a) Basic level training on DSC, TG and FT-IR equipment: 5<sup>th</sup> February 2010.**



**Figure 13:** Preparation of samples for DSC by Hebe representative, Hrvoje Škoc



**Figure 14:** Basic level trainer, Piotr Witkowski and researcher Zorana Kovačević

**b) Advanced level training DSC, TG and FT-IR equipment: 25<sup>th</sup> to 26<sup>th</sup> February 2010.**



**Figure 15:** Trainer Stefano Pera, Perkin Elmer Italy holding TGA education



**Figure 16:** Researcher Sandra Flinčec Grgac at the TGA training. Appointed to be in charge for the instrument

**a) Basic level training on SEM: February 2010.**



**Figure 17:** Marin Šuofek, authorized representative of Tescan and participants of the basic level training

**b) Advanced level training on SEM and EDS: April-May 2010.**

The advanced level of training was on the usage of energy dispersive spectrometry and its software. The last official training was for the usage of the sputtering device, which has been delivered as the third component of this set of instruments.

**T.4.5 Presentation of new laboratories**

**1. The opening ceremony: 25.02.2010**

The opening ceremony was held in the presence of Radovan Fuchs, Minister of Science, Education and Sports, Prof. Aleksa Bjeliš, Rector of the University of Zagreb, Hrvoje Meštrić, Director of the Directorate for Science at the Ministry of Science, Education and Sport and Ante Rezo, Senior advisor for Textil and Leather industry of Ministry of Economy, Labour and Entrepreneurship.



Coordinator of FP7-REGPOT-2008-1-229801: Unlocking the Textile Research Potentials (T-Pot) project Prof. Sandra Bischof Vukušić has expressed the welcome and shortly presented the project activities. Dean of the University of Zagreb Faculty of Textile Technology, Prof. Darko Ujević, held the first speech and presented scientific and educational activities of Faculty of Textile Technology. The laboratories were opened officially by the Minister of Science, Education and Sports, Radovan Fuchs with the words of pride and satisfaction for the exceptional success of the Faculty of Textile Technology.

**Figure 18:** Opening ceremony - left to right: PhD Hrvoje Meštrić, PhD Drago Katović, PhD Aleksa Bjeliš, PhD Radovan Fuchs and PhD Sandra Bischof-Vukušić

Presentation was documented by national television and newspapers. A TV presentation in duration of 2 minutes is shown on national TV as a part of daily evening news in prime evening time.

## **2. Presentation of laboratories during the Textile Forum, held on 2<sup>nd</sup> November 2011.**

The group attending the lecture of Prof. Yang consisted of aprox.75 scientist from different R&D institutions: representatives of 5 Faculties and Ruđer Bošković Institute. After the lecture, new laboratories were presented and Prof. Yang was available for the individual consultations with the interested PhD candidates or junior researchers. New contacts with other Croatian spectroscopy and termoanalysis research groups have been made.

## **3. Presentation of laboratories, during the Annual Conference of Croatian Microscopy Society (CMS), held on 2<sup>nd</sup> December 2011.**

Due to the purchase of SEM, Faculty of Textile Technology was hosting the Annual 2011 Conference of CMS. More than 70 CMS members were present and after the officel programme, new laboratories were presented.

## **WP5 – Organisation of workshops and conferences**

**Objectives of WP5** – Organizition of workshops and conferences are the following:

- know-how transfer and dissemination of scientific information
- improving and developing skills at all levels of human resources
- training activity in order to provide highly qualified and skilled workforce and to create a core group of well-trained researchers with the skills to spread the achieved success

### **T 5.1. Training in partners' premises**

In-house 3 day training events at partner (host) institutions:

- LEITAT, Spain (topics: Functional finishing)
- Institute for Natural Fibres, Poland (topic: Multifunctional fibres, Fibers reinforced composites)
- STFI, Germany, (topic: Technical textiles, Quality)

- GZE, Italy (topic: Functional Design).

### **5.1.1. Workshop at Technological center LEITAT**

The workshop was held from June 16-19, 2009 at Terrassa, Spain. LEITAT is a Technological Center dedicated to providing services to other companies of the industrial sector, adding technological value not only to the products, but to their processing as well. While focusing on Research, Development, and Innovation (R+D+I), these services offered by LEITAT, are clearly oriented and aimed to comply with a constantly changing market. The Technological Center LEITAT was founded in 1906. Since its origins, LEITAT has prioritized its service vocation to companies and their needs, fostering, honesty, professionalism, respect for others and the environment. The promise to pursue the best technological solutions for other companies, has allowed LEITAT to collaborate closely with Public Institutions, State Bodies, Universities, and other technological centers, in search of the most efficient answers to the client's demands.

A multidisciplinary staff, composed by PhD, expert researchers and engineers, comprises the solid foundation of their development - not only on project development, but on the design and guidance as well, always directed towards the needs of the final client.

LEITAT is currently working and collaborating with a wide variety of sectors that range from aeronautics, automotive industry, construction, energy, safety and protection systems, plastic and metal materials, maritime, healthcare, environment, furniture, to textile.

Technological center Leitatz hosted a workshop for 12 participants from Croatia: ten from Faculty of Textile Technology and two Croatian textile industry representatives from Čateks and Dorateks.



**Figures 19-20:** First Workshop was held at Leitatz's premises from 16<sup>th</sup> till 20<sup>th</sup> June 2009 in Terrassa, Spain

The three-day workshop (June 17<sup>th</sup> - June 19<sup>th</sup> 2009), consisted of two lectures per day, including laboratory practices. The workshop topics were the following:

1. Innovative textile finishing, presented by Roshan Paul, Ph.D.
2. Plasma technology applied to textiles, presented by Lorenzo Bautista
3. Smart materials and technical textiles, presented by Laurent Aubouy, Ph.D.
4. Eco-design, presented by Marta Escamilla Monell
5. Properties, applications and uses of technical textiles, presented by Javier Jimenez Romero
6. Biotechnology in textile sector and textile care, presented by Marta Alaman & Anna Surribas Casalprim, Ph.D.



### **5.1.2. Workshop at STFI**

STFI was founded on the 17 February 1992 by 24 enterprises and institutions of the textile industry. Since December 2006 STFI has been associated to the Chemnitz University of Technology. STFI has 120 employees (researchers, laboratory assistants and technicians). Each year, more than 100 R&D projects on regional, national and transnational level are carried out by STFI in the fields of Technical Textiles, Nonwovens/Films, Warp-knitting/Weaving, Textile Finishing/Ecology, Textile Recycling, Vegetable Fibres, Technical Nets and Ropes and Textile Materials Research.

Saxon Textile Research Institute (STFI) workshop was organised in Chemnitz, Germany, from 29th November to 4th December 2009. The workshop was held for 8 researchers from the Faculty of Textile Technology - Assoc. Prof. Sandra Bischof-Vukušić, Ph. D., Prof. Drago Katović, Ph. D., Assoc. Prof. Edita Vujasinović, Ph. D., Eva Magovac, B. Sc., Junior Researcher Dragana Kopitar, B. Sc., Assistant Žaklina Domjanić, B. Sc., Junior Researcher Maja Somogyi, B. Sc. and Junior Researcher Snježana Brnada, B. Sc., and two participants from industry Mr. Alan Đurek, B. Sc. (Regeneracija) and Ms. Marijana Željko, B. Sc. (Kelteks). The workshop consists of the following activities:

- A one-day visit to SOEX textile recycling company
- A one-day workshop on technical textiles at STFI premises (including visit to STFI laboratories)
- Attendance at 9<sup>th</sup> STFI-COLLOQUIUM - Recycling for textiles (re4ex), a two-day colloquium organised by STFI on textile recycling

#### **a) Visit to SOEX textile recycling company**

On 30th November 2009 T-Pot group have visited SOEX company for recycling of old clothes (textile waste) and converting it into material for automotive or construction industry. Old clothes are converted into valuable recycled product. The company is located in Wolfen (Sachsen-Anhalt). SOEX employs approx. 550 workers, among them qualified IT experts and experts in departments of sorting, warehouse and logistics. The supervisor processes orders (processes orders of the buyers of certain articles, with every buyer identified by his own number and a list of ordered articles), monitors movement of articles (the transport line is 5 km long) and looks for possible technical problems. There are three production areas in the company headquarters: RE-WEAR, RE-USE and RE-CYCLE. A detailed description of each of the processes and activities in the plant is presented in the deliverable D 5.1. SOEX visit report.



**Figure 21:** Visit to Soex company during the Third Workshop, held at STFI's premises.



**Figure 22:** Workshop attendees at the premises of STFI.

## **b) Workshop on Technical Textile Recycling at STFI**

The T-pot workshop called “Technical Textiles/Textile Recycling”, organized by the STFI, started on Tuesday, 2 December 2009.

The main topics of the workshop were the following:

### **Technical Textiles**

- Development trends and statistics
- Industrial applications of technical textiles
- Certification of personal protective equipment
- Certification of geosynthetics

### **Textile Recycling**

- General introduction
- Recycling processes and machinery
- Testing of reclaimed fibres
- Practical recycling tests.

The workshop was composed of 12 lectures in three blocks. A detailed report on topics and outcomes of the workshop are presented in the deliverable 5.3. Report on STFI workshop.

## **c) 9<sup>th</sup> STFI Colloquium – Recycling for textiles**

On 2<sup>nd</sup> and 3<sup>rd</sup> of December 2009, the **9th STFI-COLLOQUIUM - Recycling for textiles (re4ex)** was held, organized by Sächsisches Textilforschungsinstitut e.V, Germany. The colloquium venue was Günnewig Hotel Chemnitzer Hof in Chemnitz, Germany. The growth of population results in increasing consumption, disposing of and recycling textile wastes, which are increasingly being monitored and new textile waste disposal acts are being enacted. Forty years ago the institutes already started to investigate textile wastes while nowadays approximately 53% of textile wastes are returned to renewed use.



**Figure 23-24:** T-Pot representatives at the STFI Colloquium Recycling for Textiles

### **5.1.3. Workshop at INFMP**

The workshop organized by the Institute of Natural Fibers and Medicinal Plants was held in Poznan, Poland from 15th to 17th of June 2010. This Institute is the only interdisciplinary research unit with international significance in Poland which takes care of complex researches concerning obtaining and processing natural lignocellulosic fibre raw materials such as: flax, hemp, and protein ones such as: silk, wool and many other fibres.

The workshop was attended by 8 representatives of the Faculty of Textile Technology University of Zagreb (Prof. Sandra Bischof-Vukusic, Prof. Drago Katovic, Prof. Zeljko Penava, Sandra Flincec-Grgac, Tihana Dekanic, Marina Turalija, Zorana Kovacevic, Eva Magovac) and 2 representatives from the Croatian textile industry (Ms. Natasa Kozina from Tekstil Lio d.o.o. Ms. Sanda Loncar from Beram d.o.o.).

The following topics were presented at this three-day workshop:

- Cellubast-Centre of excellence on natural lignocellulosic fibrous raw materials
- Friendly new generation textile products
- New methods for utilization of textile wastes.

The topic of the first day of the workshop was: Cellubast-Centre of excellence on natural lignocellulosic fibrous raw materials, and the subjects of the lectures which were held that day were following:

1. Biological progress in breeding fibre flax and growing technology in studies carried out at the Institute of Natural Fibres and Medicinal Plants
2. Biology and behaviour of silkworms
3. Analysis of natural fibers with SEM application
4. Review of retting methods – Osmotic degumming
5. Natural fibers reinforced polymer composites.

The topic of the second day of the workshop was "Multifunctional human friendly new generation textile products", presented by Malgorzata Zimniewska. After the presentations, the attendees visited all the institute departments - the biotechnology department, department for natural polymer composites, gene bank, laboratory of silkworm breeding and mulberry cultivation, department of bast fiber plants processing technology and department of textile raw materials and products metrology.

The topic of the third day of the workshop was "New methods for textile wastes utilization", presented by. Jerzy Mańkowski.



**Figure 25:** Laboratory of silkworm breeding.



**Figure 26:** Visit to experimental plant Lenkon.

After the finalisation of the lectures the group of Croatian representatives visited experimental plant "Lenkon". The Farm is situated about 25 km away from Poznan on the road to Wroclaw. The basic objective of the farm is conducting scientific and implementation activities in terms of obtaining and manufacturing flax and hemp straw as well as carrying out experiments associated with different applications and utilization of fibrous raw materials. The farm is equipped with special machines

which enable realisation of experimental and implementation of projects to be carried out. The most important experimental devices owned by the Farm are a scutching drum unit for determining the content of long fibre, a tow aggregate for experimental manufacturing of short fibres, a testing unit which includes carding machines, drawing frames and spinning frames for manufacturing technical yarns, a unit used for producing non-wovens, an apparatus used for cottonisation of flax and hemp fibres, a prototype line for fibre plants decortication for pulp and paper purposes and for composite materials. The attendees have seen the whole production cycle: from the cultivation of linen and hemp plants, mechanical and chemical treatments during the production and finally spinning, weaving and finishing of yarn.

## **T 5.2. Training at TTF premises:**

- A 3-day training events at TTF premises:
- Training at TTF (topic: Innovation)
- Training at TTF (topic: Innovation management).

### **5.2.1. Workshop on Innovations in T/C and ICT sectors**

**Workshop: *The role of innovations, in particular for textile/clothing and ICT sectors*** was organized jointly by the University of Zagreb, Faculty of Textile Technology & Croatian Chamber of Economy. The workshop was held from 21-23 September 2009, at the premises of the Croatian Chamber of Commerce and attended by 76 participants.

	<b>21.09.2009.</b>	<b>22.09.2009.</b>	<b>23.09.2009.</b>
<b>Topics:</b>	<b>General</b>	<b>Textile/Clothing</b>	<b>ICT</b>
9.00 – 9.45	<b>Opening words</b> Vesna Torbarina (CCE) & Sandra Bischof Vukušić (TTF)	<b>How to innovate for textile sector?</b> Jordi Mota (LEITAT, ES)	<b>ICT in FP7</b> Ebonita Ćurković, FP7 ICT NCP (HIT)
9.45 – 10.30	<b>Commercialization of innovation</b> Srđan Novak (Technology Transfer Office, UNIZG)	Textile Clusters: <b>Croatian Cluster for Special Clothing</b> Zlatko Ivanković (HUP)	<b>ICT Cluster</b> Boris Krstanović (Multilink)
<b>10.30 – 11.00 Coffee break</b>			
11.00 – 12.00	<b>System of subsidizing knowledge-based society through BICRO</b> Ante Mamić (BICRO)	<b>Innovation in technical textiles</b> Romy Naumann (STFI, DE)	<b>Case study of ICT integration of electroluminescent devices into garments</b> Elena Turco (GZE, IT)
<b>12.00 – 13.00 Lunch</b>			
13.00 – 13.40	<b>Innovation – Protection and IPR</b> Petra Franitza (STFI, DE)	<b>GZE's concept of full design service</b> Elena Turco (GZE, IT)	<b>Case study of successful FP6 project: Innutex</b> Jordi Mota (Leitat, ES)

13.40 – 15.00	<b>Croatian Textile Portals</b> Željko Penava & Sandra Bischof Vukušić (TTF)	<b>Innovation in UV protection by textiles</b> Malgorzata Zimniewska (INFMP, PL)	<b>Case Study of Ruđer Inovacije</b> Davor Aničić (Ruđer Inovacije)
<b>Closing</b>			

The most interesting lecture at the workshop, according to the public reaction and filled-out Questionnaire, was a lecture given by Mrs. Elena Turco from the Italian company GZE. She presented an innovative design of the GZE company, followed with the practical example of a motorcycle jacket. On this textile product with ICT integration consisting of electroluminescent device integrated into a protective garment.

At this workshop, Croatian lecturers demonstrated a great potential for scientific research, as well as numerous opportunities for the RTD institutions and small and medium-sized enterprises (SMEs) with the aim of better integration in European research area (ERA).

Lecturers from the European Union through their presentation, and particularly through their active involvement in the discussion held after the lectures, gave positive examples of good practice, where the innovation has led to a new product, process or service and thereby ensured competitiveness on the market.



Visit of MB members to Croatian SME Keltteks, 24<sup>th</sup> September 2009

**Figure 27-28:** Second Workshop was organized by TTF and held at the premises of Croatian Chamber of Commerce from 21<sup>st</sup> till 23<sup>rd</sup> September 2009, Zagreb, Croatia

### **5.2.2. Workshop Innovation Management**

Workshop: *Innovation management*, was organized jointly with Croatian Chamber of Trades and Crafts (HOK) in Zagreb, 9<sup>th</sup> – 11<sup>th</sup> May 2011.

Aim of the workshop is to intensify the cooperation between academy & industry. The topic of Innovation management has been chosen in order to present the importance innovation potential mapping and the further exploitation of knowledge gained within RTDs, SMEs or their joint efforts.

Date:	9 <sup>th</sup> May 2011	10 <sup>th</sup> May 2011	11 <sup>th</sup> May 2011
Theme:	Innovation management	Science & Inovations	SME & Innovations
9.00-9.15	Introduction: <b>Dragutin Ranogajec</b> (HOK), <b>Melita Kovačević</b> (UNIZG), <b>Sandra Bischof Vukušić</b> (TTF)	<b>Sean Mc Carthy</b> (Hyperion Ltd.)  <i>From science to shares</i>	<b>Campbell Warden</b> (IAC)  <i>Participatory approaches for sustainable management</i>
9.15-10.30	<b>Srđan Novak</b> (UNIZG) <i>Technology mapping at the UNIZG</i>	<ul style="list-style-type: none"> <li>• Innovation in Enterprises</li> <li>• Obstacles to Academia/Industry Co-operation</li> </ul>	
	<b>Hrvoje Zorc</b> (IRB) <i>Innovation potential of the Institute Ruđer Bošković</i>		
<b>10.30 – 11.00 Coffee break</b>			
11.00-11.45	<b>Domagoj Oreb</b> (Rudjer Innovations) <i>Technology transfer and innovations</i>	<ul style="list-style-type: none"> <li>• EU Policy on Innovation</li> <li>• Innovation at National Level (Case Study of Ireland)</li> </ul>	<b>Gordana Prutki-Pečnik</b> (Eracon projekt d.o.o.), <i>IMP<sup>3</sup>rove – Innovation potential &amp; Benefit for SMEs</i>  • Case study of one Croatian firm
11.45-13.15	<b>Irina Bujor</b> & Campbell Warden <i>Applying Foresight Technology to the Romanian Higher Education System</i>		
<b>13.15 – 14.30 Lunch break</b>			
14.30 – 15.15	<b>Dina Korper Žemva</b> <i>IPR issues</i>	<b>Miguel Ángel Perez</b> (Leitat)  <i>Bussines case model.</i>	<b>Elena Turco</b> (GZE) <i>Case study of GZE</i>
15.15 – 16.00	<b>Petra Franitza</b> (STFI) <i>Importance of IPR &amp; exploitation of RTD results</i>	<i>Technology watching and Portfolio Management</i>	<b>Sandra Bischof Vukušić</b> (TTF) <i>Conclusion remarks</i>



**Figure 29-30:** Attendees at the workshop Innovation management, held at the Croatian Chamber of Trades and Crafts from 9 till 11 May 2011.

### **T 5.3. International Textile, Clothing & Design Conference (ITC & DC) 2010**

- Scientific dissemination of partnership results
- Progress meeting of the Management board.

5<sup>th</sup> ITC&DC 2010 was organised by the Faculty of Textile Technology, University of Zagreb. It was held at Dubrovnik from 3<sup>rd</sup> to 6<sup>th</sup> October 2010 in the International Centre of Croatian Universities (ICCU). The Conference was attended by 247 attendees, from 36 countries. There were scientists and experts from different research community (natural science, material science, textile technology, ecology, management etc.), textile and chemical industry, journalists (AATCC Review, Tekstil, Journal of Natural Fibres), students etc.

At the Conference 168 papers were presented and 9 of them (listed in Template A1) were from T-Pot's scientists.

### **T 5.4. Textile Science and Economy Symposium & Round table**

Textile Science & Economy is a scientific-professional symposium is organized jointly with: The Scientific Council for the Technological Development of Croatian Academy of Sciences and Arts and Croatian Academy of Engineering, and under the auspices of Ministry of Science, Education and Sports, Ministry of Economy, Labour and Entrepreneurship and Croatian Chamber of Economy. The 2010 Symposium was co-funded by the European Commission through the T-Pot project.

Since 2010, TS&E Symposium gained the status of an international one and apart from the partners of the T-Pot project following associates from member or associated states of Germany, Spain, Poland, Italy, Hungary, Austria, USA, Slovenia, Serbia, Albania and Kosovo were present.

The Symposium's objectives were:

- Presentation of scientific research potential in synergy with the economy.
- Contribution to the revitalization of economic subjects through the discussion at the Roundtable - together with the eminent foreign colleagues.

The general aim of the TS&E Symposium is to intensify the cooperation between TTF and the industry. The following topics are specified in order to boost the growth of the Croatian textile industry:

1. Plenary lecture: Grado Zero Espace's Design Method Applied on New Product Development and Consulting, presented by Elena Turco, GZE
2. Invited lecture: Strategy of the Textile and Clothing Industry - Status and Prospects, presented by Milan Lušić, Varteks
3. Invited lecture: Types and Ways of Technology Transfer, presented by Neda Matijević, Ministry of Economy, Labour and Entrepreneurship

The novelty as to former TS&C conferences was the Round Table on which the participants actively pursued the topics of mutual interest for both the businessmen and scientists regarding the textile, clothes and footwear industry. **The Round table** has been organized after plenary and invited lectures so that the participants of the Symposium could debate on the topics: Position of European and Croatian Textile and Clothing Industry in the Global Surrounding. After the discussion, suggestions have been made and important conclusions were adopted:

#### **Suggestions of the Round table:**

- 1) Inclusion of Faculty of Textile Technology in the process of revising, coordinating and implementing strategies of textile and clothing industry.
- 2) Planning funds for financing the preparation of projects from the budget of Strategies of textile and clothing industry.
- 3) Ministry of Economy, Labour and Entrepreneurship is kindly requested to clarify the selection criteria of project funding in more details.

#### **Conclusions of the Round table:**

- 1) Cooperation between science and economy should be further intensified:
  - through scientific research and projects
  - through better usage of TTF's human and material resources.
- 2) The future of textile industry lies in the innovations, branding and niche markets.

The third International scientific-professional symposium Textile Science and Economy ended with a fashion show organized by the talented students of the Faculty of Textile Technology. Through a variety of colours and forms of their creations they highlighted the importance of linkages between the academy and industry.

### **T 5.5. Attendance at Textile and related conferences:**

#### **5.5.1. Attendance at textile conferences: AATCC, AUTEX, WIRE**

T-Pot coordinator prof. Sandra Bischof Vukusic attended **AATCC 2009** conference held in Myrtle Beach from 10th till 12th March 2009, jointly with the activity T.2.5 Researchers secondment (up to 2 weeks). Within T.2.5 Prof. Sandra Bischof Vukusic visited Prof. C.Q. Yang from the University of Georgia (UGA) and working with him for 2 weeks on the topic: Flame retardancy of cellulose materials treated with organophosphorus agents. At UGA she finished extensive training on novel equipment - Micro Cone Calorimeter (MCC) which is in a purchase plan of Faculty of Textile Technology.

Two TTF researchers (Prof. Drago Katović and Prof. Tanja Pušić) attended **AATCC 2010** conference held in Myrtle Beach from 18th till 20th May 2010. Prof. Pušić presented the paper entitled: *Microcapsules Quantification Using Streaming Potential Method*, while Prof. Katović, as President of Textile Science Research Centre presented activities of TSRC, upon the finalisation of lectures. New contacts have been established with the representatives of the American company Cotton incorporated.





**Figure 31:** The representatives of the Faculty of Textile Technology and Ken Greeson from the American Company - Cotton Incorporate

Prof. Katovic, in a capacity of the TSRC president attended WIRE2010 event. At the **WIRE2010** (Week of Innovative Regions in Europe - <http://wire.econgresos.com>), held at 15-17th March in Granada, Spain University of Zagreb, Faculty of Textile Technology participated in the Category 3, Connecting Research Centres from all over Europe (REGPOT) with the poster presentation No. 49 entitled: Unlocking the Croatian Textile Research Potentials.

The event was organized jointly by the Spanish Ministry of Science and Innovation and the European Commission, under the auspices of the Spanish EU Council Presidency. The conference focus was on „*how to move from synergies of policies to synergies of actions for the optimal use of EU instruments, with the objective of making regions full protagonists in building the knowledge-based society*“.

### 5.5.2. Entering the new fields

In July 2010 two of TTF T-Pot project team members participated at **16<sup>th</sup> International Zeolite Conference** (16<sup>th</sup> IZC) joined with the 7<sup>th</sup> International Mesostructured Materials Symposium (7<sup>th</sup> IMMS) which was held from July 4-9, 2010 in Sorrento, Italy. The Conference was organized by the International Zeolite Association (IZA) and the International Mesostructured Material Association (IMMA), together with the Italian Zeolite Association (AIZ), the Interdivisional Group of Catalysis and the Division of Industrial Chemistry of the Italian Chemical Society (SCI). The Conference was preceded by an intensive **Summer School** (July 2-3<sup>rd</sup>, 2010) in the Congress Centre Hotel Pietra di Luna, Maiori, Salerno, Italy. The school was attended by the young scientists and students from all over the World (China, Brazil, France, Germany, Czech Republic, Italy, Slovenia, The Netherlands, Croatia etc.) The pre-conference school was attended by T-Pot members Sandra Flinčec Grgac and Zorana Kovačević.

	Fifth International Conference on Advanced Materials and Nanotechnology
7-11 February 2011	Wellington, New Zealand

⇒ Presentation in the new sections:

- Frontiers in electron microscopy.
- Measurement and modelling of phenomena in advanced materials

Beside this AMN-5 offered two free of charge Pre Congress Workshops: **Pre Congress Workshop 1 – Multidisciplinary Collaborative Research Ventures – The Keys to Success** and **Pre Congress Workshop 2 – EU Materials- related COST Programme**, both of them attracted our attention since it seems that they might be of great importance for our research group in our future research work and networking.

Having in mind that such trip is time and money consuming our intention was to benefit from it in a way that at the same time we can visit New Zealand's University where textile, especially textile design is taught, because we want to get some impressions and knowledge in functional textile design (design for specific purpose e.g. design of protective clothing) while this seems to be one of the weak point within our Croatian T-Pot research team since our design staff are more oriented on creativity then on functionality.

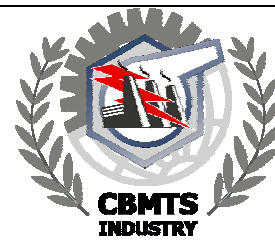
In order to be in line with the state of the art in this field our decision was to attend one or some of the Conferences where we will be able to see what is new and in focus within advanced materials and nanotechnology. Since 2011 has been chosen as the **International Year of Chemistry, IYC2011**, there were a lot of announcements for the Conferences intended as a worldwide celebration of the achievements of chemistry and its contributions to the well-being of humankind. After careful screening of all those Conferences (purposes, topics, possibilities, etc) our decision was to attend **Fifth International Conference on Advanced Materials and Nanotechnology (AMN-5)** that was scheduled from 7<sup>th</sup> till 11<sup>th</sup> February 2011. The reasons for this decision were:

Among all listed Conferences, although some of them were in Europe, this was the only one Conference that was focused on all and different kind of advanced materials and related nanotechnology. This Conference is held every two year with a lot of scientists from all over the World and it is always located at southern hemisphere (somewhere in New Zealand – Dunedin, Wellington, Christchurch). Since announced Contributors included Nobel Laureate Professor Sir Anthony Leggett (Illinois, USA), Professor Sir Richard Friend, (Cambridge, UK), Professor Jean Fréchet (Berkeley and LBNL, USA), and Professor Neil W Ashcroft (Cornell, USA) it will be great opportunity to see, hear and talk with distinguish scientists that indebted the mankind.

According to the listed topics The Fifth International Conference on Advanced Materials and Nanotechnology (AMN-5) might offer a broad interdisciplinary overview of advanced materials and nanotechnology, and provide an exciting forum to discuss new and exciting advances in the field of nanoengineered materials and devices, electron microscopy, functional nanocoatings, hybrid materials, new materials and devices for radiation imaging and detection and advanced materials.


All of these are more or less in line with our research so we were able to present some of our research within T-Pot project (two oral presentations) as well as to promote T-Pot project as part of broader European FP7 projects and philosophy.

⇒ **The World Congress on Chemical, Biological, Radiological / Nuclear Threat (CBRN) & Chemical and Biological Medical Treatment Symposium (CBMTS) -Industry VII**, were held from 10-15.4.2011. in Cavtat, Croatia  
At the CBMTS VII Symposium a new section was open for the first time. This section entitled Protective materials, protective clothing and equipment against CBRN threats was chaired by T-Pot manager Edita Vujasinović.



Our appearance at this Congress was a great opportunity for us to enter in to the military world with textiles and achievements that we have in the field of protective clothing. This assumption proved to be right since we had numerous contacts, some proposition for future work and some suggestions for new study discipline (regarding materials and design for protective and military clothing) at our Faculty.

<p><b>Textile Bioengineering and Informatics Society (TBIS) 2011 International Symposium on Advanced Textiles, Fashionable Industry</b>, was held from 27<sup>th</sup> to 29<sup>th</sup> May, 2011 in Beijing, China. Prof. D. Ujević, T-Pot manager, was invited to the TBIS 2011 Symposium as a keynote speaker and member of the International Scientific Committee of TBIS 2011.</p> <p>During the conference a new contact was established with internationally-recognized expert in the field of Clothing Technology and Anthropometry Prof. Susan Ashdown, Ph. D. from the United States. Professor offered cooperation through the exchange of data related to PEDUS 3D Foot Scanner by Human Solutions and expertise. Such 3D multifunction scanner is recently purchased by TTF and is in the usage for the anthropometric measurements.</p>	 <p><b>TBIS</b></p> <p>TBIS 2011</p> <p>International Symposium on "Advanced Textiles, Fashionable Industry"</p>
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<p><b>20<sup>th</sup> Annual International Conference on Composites or Nano Engineering ICCE-20</b>, will be held from 22<sup>th</sup> -28<sup>th</sup> July 2012 in Beijing, China.</p> <p>Prof. S. Bischof, T-Pot coordinator, is invited to ICCE Conference as a keynote speaker by Conference Chair, Prof. D. Hui. Prior to the conference Prof. Hui was guest of the University of Zagreb and held two lectures dealing with the emerging topic of nano-engineered materials with the emphasis on safety of materials usage.</p>	
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**T 5.6. Dissemination conference**

Due to the prolongation of project of 6 months, Final dissemination conference was held on 16<sup>th</sup> February 2012 and not in 2011 as initially planned.

Organised by TSRC in cooperation and at the premises of Croatian Chamber of Trades and Crafts, where all partnering organisations presented results of the partnership established during the project and vision of further cooperation. Exhibition of Protective materials/clothing of Croatian SMEs and craftsmen was organized, resulted with the huge participation of the representatives from industrial sector at the Dissemination conference. Both clusters: **Teksko mreža** (<http://www.teksko-mreza.com/eng/members/>) and **Opteko grupa** (<http://opteko.hr/en/>) working in the domain of protective clothing were present, gathering all together 30 SMEs.



**Figure 32:** Dissemination conference, held on 16<sup>th</sup> February 2012



**Figure 33:** Exhibition of products of Croatian clusters, SMEs and crafts in the sector of Protective Textiles

## WP6 – Dissemination

### Objectives of WP6

- international promotion of Textile Science Research Centre of the Faculty of Textile Technology, University of Zagreb and Croatian T/C SMEs research potentials
- disseminating and exploiting of strategic partnerships results and obtained knowledge
- publishing and dissemination of the information and training material compiled at project activities
- enhancing the rate of proposals submission.

### T.6.1 Textile Science Research Portal, <http://www.ts-rc.eu>



The Textile Science Research Portal is set up and maintained by the subcontractor company PENG d.o.o. The portal has been in full function since May 2009, serving as a focal point and major disseminating actor of T-Pot project, TSRC – Textile Science & Research Centre and TTF – the Faculty of Textile Technology. Textile Portal also has a function of being a meeting point and discussion forum for all interested in textile technologies and related areas. Gradually, with enhanced visibility and promotion, the portal also becomes a local technology marketplace for textile and similar companies looking for new technologies, needed equipment or partners.

### T.6.2 T-Pot web-site, <http://www.t-pot.eu>

The T-Pot web site has been set up and running since May 2009, and serves as an information point about the T-Pot project and its activities. All public deliverables, dissemination materials, articles and promo materials are available from the site to general public. The site also features a members area for project partners, to exchange information and simplify project management. The web site is run and moderated by TTF, while subcontractor PENG d.o.o. is responsible for the technical side, web administration and maintenance.

### T.6.3 STEP web site: <http://www.ttf.hr/step/>

The STEP web site is a **S**ervice for **T**extile **E**uropean **P**rojects, a special feature within a TTF main web site, dedicated to dissemination of information about EU programmes and projects relevant for the textile sector. The Service nfortuna established to assist the faculty members and the administrative staff of the Faculty of Textile Technology. The objective is popularization and assistance in coordination of the EU projects where the TTF staff are involved or intend to be involved either as partners or coordinators. The ultimate goal of the Service nfortuna to increase competitiveness of the Faculty through exchange of ideas, experience and knowledge, increasing the quality of scientific research, educational work and management in international cooperation within a framework of European projects.

The STEP web site has been in full function since April 2009 and is maintained and run by TTF staff, coordinated by a T-Pot project coordinator prof.dr.sc. Sandra Bischof Vukušić.

### T.6.4. Postgraduate Seminars

Instead of initially planned brochure the papers submitted for the Textile Science Research Centre competition were published in book entitled: Young Scientist in the Protective Textiles Research.

Award ceremony of TSRC of the most successful scientific or artistic research work of young scientists in the field of protective textiles and promotion of the book was held on 18<sup>th</sup> of July 2011 at the premises of the Rectorate of the University of Zagreb.



**Fig. 34:** Vice-Rector M. Kovačević is author of the first chapter entitled *Present and the future of research at the University of Zagreb*



**Fig. 35:** First place in the category of students won students Jelena Hačko and Slavica Andrić with the research entitled *Application of argon plasma to improve the fixing*, made under the mentorship of Ph.D. S. Ercegović.

## **T 6.5. Textile Forums**

A total of 3 textile forums were envisaged to be held in the project life. Deviation from the initial plan has been made and 3 new topics have been chosen. During the project lifetime a strong cooperation with 3 SMEs has been established:

- Cotton Incorporated, NC, USA, contact person: Ken Greeson
- Du Pont International, Slovenia, contact person: Ljubica Česnik, *Safety & Protection*,
- Schoeller Textiles, Switzerland, contact person: Dinka Liplin-Prpić, *Power of Innovation*.

### **6.5.1. Cotton Incorporated**

Initial contacts have been established at AATCC 2010 conference in Atlanta. Upon the visit of 2 representatives, funded by their own funds, a long term collaboration has been established. Further initiative is submission of R&D proposal for cotton research, coordinated by TSRC, to Cotton Incorporated research department. Proposal title is:

- *Hand & drape upgrading of cotton and cotton blended fabrics for the Women's Wear.*

### **6.5.2. Du Pont International**

Initial contacts have been established through the collaboration with Croatian SME HEMCO, which has Certificate as DuPont Quality Partner, since 2009. During the 10th International fair on protection of persons & property INTERPROTEX, the collaboration with regional representative of DuPont has been established. Further activity was joint presentation of HEMCO and DuPont at the Exhibition held during the T-Pot's Dissemination Conference.



**Figure 36:** Collaboration of representatives of TSRC (S. Bischof V. and T. Pušić), Croatian Association of Textile Engineers (A. Vinčić), DuPont (Lj. Česnik) and HEMCO (S. Mihalj)

Sustainability of the cooperation is confirmed with the further activities:

- Lecture held by Lj. Česnik entitled: *Safety & Protection*, planned for June 2012
- study tour to DuPont testing laboratories in Switzerland, planned for September 2012 with the purpose to organize agreement for the long-term scientific cooperation.

### 6.5.3. Schoeller Textiles, Switzerland

Initial contacts have been established through the collaboration with SME Galeb, Omiš – final user of Schoellers yarns for their production of FR protective knittwear. Sustainability of this cooperation is confirmed with the serie of lectures held by regional representative Dinka Liplin-Prpić. First □nfortun the serie of Longlife learning seminars is entitled *Power of Innovation*, and planned for May 2012.



**Figure 37:** New collaboration with representative of Schoeller, Ms. D. Liplin-Prpić

### T.6.6 Presentations

T-Pot project has been well covered by national media for all major events – Innovation workshop and TS &E 2010 Symposium, but especially in the event of the official opening of the new laboratories (see WP4), when a national TV broadcast a special 2 minute show on the opening in a prime time evening news. National TV also broadcast a featured 2 minute show on 17 March 2009 about T-Pot and TSRC with TSRC president prof. Drago Katović and T-Pot coordinator prof. Sandra Bischof Vukušić as guests, as a part of regular show „The Panorama of Zagreb“. Another

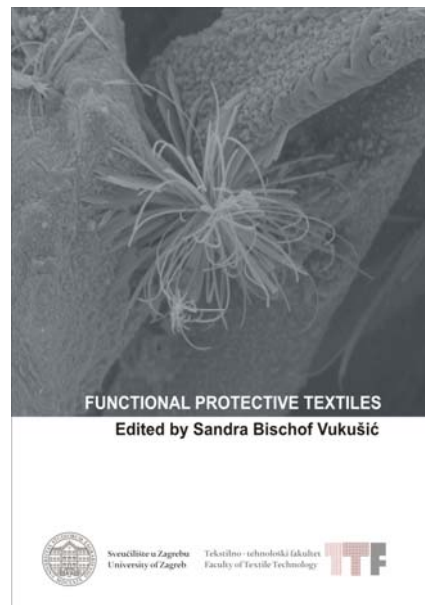
featured show was held 04 March 2010. on Croatian national TV, in duration of 20 minutes, as a part of Scientific Programme. The well established connection with the media continues to support dissemination and visibility enhancing goals of the T-Pot project. All articles, videos and photo gallery from events can be downloaded from the T-Pot web site.

### **T.6.7. Printing & Publishing**

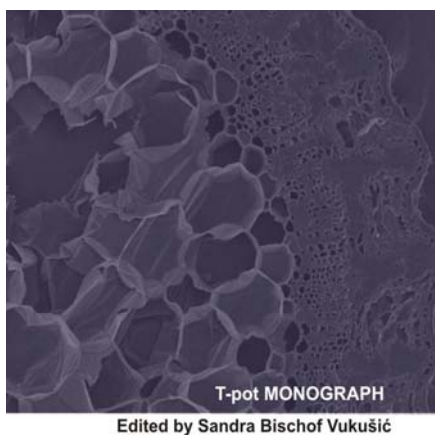
T-Pot project produced following flyers: TSRC, TSRC Laboratories and T-Pot project. Further publications were: Book of Proceedings of the TS&E 2010 Symposium and 3 books:



**Figure 38:** Young Sientists in Protective Textiles Research, ISBN 978-953-7105-41-9



**Figure 39:** Functional Protective Textiles, ISBN 978-953-7105-45-7



**Figure 40:** T-Pot monograph, ISBN 978-953-7105-46-4

#### **1.1.4. The potential impact (including the socio-economic impact and the wider societal implications) and the main dissemination activities and exploitation of the results (10 pages)**

The main S&T results/foreground is upgrading of material/human capacities of Textile Science Research Center (TSRC) and knowledge transfer from EU partnering institutions and trained TSRC staff, both to the academic and industrial sector.

##### ***Materials reinforcement***

One of T-Pot's highest priorities was the improvement of scientific infrastructure in order to reduce the gap between our present state and EU standards. Investing in equipment served another important purpose – to boost the development of applied research, development of methods, technologies or new products. Furthermore, this acquisition of new equipment certainly contributes to the reinforcement of Croatian internal scientific and technical capacities, allowing us easier future participation in the research activities of the European Research Area.

Two laboratories were funded by T-Pot project, **SEM Laboratory** and **Textile Science Research Laboratory**. Opening was held on 25/02/2010 in the presence of Minister of Science, Education and Sports, Rector of the University of Zagreb and representative of Ministry of Economy, Labour and Entrepreneurship. The event was widely covered by all national media. National TV broadcasted a special report in the prime time. Two trainings were organized at each set of equipment: a **basic level training** immediately after the installation of the equipment, and an **advanced level training** 3 weeks after the installation. Both trainings were attended by 9 TTF researchers.

The equipment is in full use and offered to the wider community – academic and industrial users. The number of both academic and industrial users is steadily growing, thus adding to recognisibility of TSRC in community and ERA.

Already a short period after the installation, the equipment has proven to be of great importance to national universities: University Of Zagreb and University of Rijeka, but to the the other regional R&D institutions, such as Universities of Ljubljana, Maribor and Belgrade. The following entities of University of Zagreb were using the equipment:

- Faculty of Mechanical Engineering, Faculty of Civil Engineering, Faculty of Chemical Engineering and Technology, Faculty of Forestry, Faculty of Graphic Art and Faculty of Science.

The following SMEs have been using the microscope for their research purposes: Labud d.d.; Jadran tvornica čarapa d.d., Čateks d.d., Galeb d.d., Kelteks, Varteks, HEMCO, Vodoprivreda and Aero (Slovenia).

##### ***Human reinforcement***

An important task conducted within the T-Pot project with the purpose of raising the competitiveness of TTF and TSRC is the recruitment of experienced researchers. Prof. Andrea Katović from the University of Calabria, Faculty of Engineering has been recruited to the Department of Textile Chemistry & Ecology, Faculty of Textile Technology, University of Zagreb in duration of 1 year. Her expertise with SEM and TG analyses was extremely useful and shortened the basic training period. In this way full exploitation of purchased equipment and its usage by wider community was established prior to the project end. Three young researchers were working for 2 years for the project, but unfortunately up to now, none of the 4 researchers was offered a permanent position at the University of Zagreb Faculty of Textile Technology.

##### ***Know-how transfer***

Five cooperation agreements have been signed with the following strategic partnering institutions:



STFI, INFMP, LEITAT, GZE and EMPA. The further objective of organisation of workshops and conferences was fully addressed through the successful finalisation of 4 training events organised at the premises of strategic partners. Further know-how transfer was performed through the two-way research secondments. Representatives of STFI, INFMP and LEITAT have successfully finalized small research projects, which resulted with the joint papers prepared either for the conferences or journals.

Under the activity of Textile Forums, cooperation was established with 3 international SMEs (Cotton incorporated, NC, USA; DuPont European Technical Center (ETC), Switzerland and Schoeller Textiles, Switzerland). Their professional expertise is transferred primarily to the TTF's staff, but secondary to Croatian SMEs working in the similar area.

The participation at workshops organised by partnering institutions and TTF as well as participation at conferences as AATCCs, WIRE and IZC-IMMS 2010, AMN-5, TBIS and AUTEX proved to be of great value to expand and upgrade the knowledge base of TTF and visibility of TTF and TSRC on the international scientific scene. The Innovation workshop was very well attended and created a number of opportunities for exchanging of ideas and discussing future steps locally, creating at the same time good opportunities for future partnerships with participating organisations, and enhancing visibility of Croatian textile research potential. The TS&E Symposium is already well known locally and regionally, but by being organised through the EU project and with added value topics such as new feature of round table, it also contributed significantly to the promotion of Croatian textile research potential, as well as the promotion of newly established TSRC.

Organisation of conferences and workshops in cooperation with the partnering institutions, presented TTF as qualified organizer of international events having excellent database of EU collaborators and interesting novel topics to offer for the further collaboration.

***Upgrading the RTD capacity*** – enhancement of knowledge and competences of TTF's researchers. Protective textiles offer *great potential for innovation, economic growth and employment*. TSRC, upgraded to be strong RTD support for industry is becoming an important regional research centre. The aim of the TTF to produce applied research results and highly educated experts in the field is supplemented by the formation of the TSRC. The *development of strategic partnerships* with three high quality RTD institutions and one SME reinforced the research potential of TTF.

New areas are opening for our research group. We have started with protective textiles (functional textiles) and at the moment we orient our research further to the huge area of nanotechnology & nanostructures. Our further goal is to establish our microscopy group in the area of identification and characterisation of nanomaterials (EDS – chemical analysis) and our thermal analysis group (EGA analysis for determination of harmful particles).

#### ***Enhancement of Textile Science Research Centre visibility***

One of the most important dissemination activities is enhancement of visibility of TSRC and T-Pot project through 3 important means of communication: TSRC portal, T-Pot web page and STEP web page. TRSC portal is becoming a significant tool for partner search and technology market place for local companies. Finally, a wealth of information and useful documents produced through project contributes significantly to broadening of the knowledge database. Last but not least, well established cooperation with media ensures timely information on all project related events and continuous visibility. During the project life, TSRC portal established itself as a focal point to look for actual information and assistance in textile sector, a valuable link and source both for the textile sector and media.

#### ***Better integration of TTF and Croatian SMEs in the ERA***

The research potential of TTF and TSRC is significantly upgraded through T-Pot project, enabling TTF and TSRC to contribute to ERA with world-class research. Building up on its new capacities, previous ERA experience and a reputation of the leading national and regional center for textile research, TTF will strengthen its role of a knowledge center and focal point for integration of Croatian SMEs in ERA.

TTF will significantly contribute to promotion of the European Technology Platform (ETP) For the Future of Textiles and Clothing. Very few Croatian organisations are involved in Future of Textile and Clothing (FTC) platform, mostly SME Associations – Croatian Chamber of Economy (CEA) and Croatian Employer's Association and only few industrial representatives. An accent is laid on cooperation with Croatian Cluster for Special Equipment, consisting of 13 SMEs – manufacturers which are a part of primary textile industry, ready-made wear and footwear. With its new capacity, TTF can take even more active role to assist SMEs in future participation in EU funding schemes and better integration in ERA.

### ***Contribution to regional capacity building***

T-Pot project is gathering all major stakeholders in the region in the field of textiles & clothing, becoming a strong point of knowledge transfer and industry support. TSRC, upgraded to be strong RTD support for industry, is becoming an important regional research centre. The results of T-pot contribute significantly to the innovation, competitiveness and economic growth potential of regional textile industry.

### **Main dissemination activities**

The most important dissemination activities were operated through three means of communication: the TSRC portal, the T-Pot web page and the STEP web page. Cooperation with media was well established and ensured timely information on project related events and continuous visibility.

Significant dissemination goal was to enhance the rate of proposals submission. Beneath is the list of the projects submitted by the group of experienced researcher prof. Katović.

#### **1. Submitted projects**

- 1) **FP7-PEOPLE-2010-CIG** (Marie Curie Career Integration Grants): Multifunctional zeolite-cellulose composite materials (ZEOCELL). Applicant: Andrea Katović.  
**ESR:** 61.20/100 – NOT FUNDED
- 2) **FP7-PEOPLE-2010-IEF**: (Marie Curie Intra-European Fellowship): Antimicrobial polylactide for food packaging (AM-PLA). Applicant: Marina Turalija.  
**ESR:** 67.20/100 – NOT FUNDED
- 3) **FP7-NMP-2011-SME-5**: Advanced Textile solutions for pollution recovery from Oil Spills in Extreme Conditions (TEXOTREME). Applicant: Sandra Bischof Vukušić for TTF. Collaboration with project partners STFI and GZE.  
**First stage:** Positive evaluation  
**Second stage:** ESR: 11.1/15 – NOT FUNDED
- 4) **IPA 2007 HR 16 I PO 001: Nanotechnology for enhancement of science/industry collaboration**
  - Reference: **EuropeAid/131920/M/ACT/HR**, Regional Competitiveness
  - Joint submission with LEITAT
  - Submitted: October 2011 – WAITING FOR THE EVALUATION RESULTS.

#### **2. Funded projects:**

- 5) **Unity through Knowledge Fund (UKF) 2A:** Antimicrobial functionalisation of PLA polymer.



Applicant: Marina Turalija.

- Republic of Croatia, Ministry of Science, Education and Sports & EMPA, Swiss Federal Laboratories for Materials Science and Technology
- *Science and Technology Project, World Bank Loan No. 7320-HR*

**6) Development fund of the University of Zagreb:** Revitalisation of traditional textile crafts for *Spanish Broom* production – Development of autochthon products

Applicant: Sandra Bischof Vukušić and Zorana Kovačević.

- Project is accepted for funding from 1<sup>st</sup> January 2012 – 31<sup>st</sup> December 2012

### 3. Planned projects:

**7) FP7-SEC-2012.1.4-1** Protective clothing for law enforcement and first responders – Capability Project

- Joint submission with STFI and INFMP.

Full list of all dissemination activities is presented within Template A2.

#### 1.1.5. The address of the project public website

Development of the project website was a part of the activities of WP6, Dissemination and is described in details under paragraph of WP6 activities description. Project web site is located at:

<http://www.t-pot.eu>

## 1.2. Use and dissemination of the foreground

### Section A

## SECTION A

**TEMPLATE A1: LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS**

NO.	Title	Main author	Title of the periodical of the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers	Is open access provided to this publication?
1	FP7-REGPOT-1: T-Pot project funded by the European Commission	Sandra Bischof Vukušić	Tekstil Vol. 57	No. 8	Croatian Association of Textile Engineering	Zagreb	2008	418-422		no
2	Application of Scanning Electron Microscopy for Textiles	Marina Turalija, Sandra Bischof Vukušić	Tekstil Vol. 58	No. 12	Croatian Association of Textile Engineering	Zagreb	2009	640-649		no
3	Grado Zero Espace's Design Method Applied on New Product Development and Consulting	Elena Turco	Book of Proceedings of Textile Science & Economy Symposium	3 <sup>rd</sup> Symposium 22.01.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	3-12		no
4	Innovation in Technical Textiles – Exploitation and Transfer of RTD results	Petra Franitza	Book of Proceedings of Textile Science & Economy Symposium	3 <sup>rd</sup> Symposium 22.01.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	47-56		no
5	Highstick – Embroidery Technology for Innovative Technical Applications	Romy Numann	Book of Proceedings of Textile Science & Economy Symposium	3 <sup>rd</sup> Symposium 22.01.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	193-202		no
6	Technology Innovation Based on Strategic Reorientation in Textile Companies	Miquel Angel Perez	Book of Proceedings of Textile Science & Economy Symposium	3 <sup>rd</sup> Symposium 22.01.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	57- 64		no
7	Nanotechnology for UV	Roshan Paul	Book of	3 <sup>rd</sup> Symposium	University of	Zagreb	2010	155-158		no

	Protection		Proceedings of Textile Science & Economy Symposium	22.01.2010	Zagreb Faculty of Textile Technology					
8	Garment Made of Cellulosic Man-Made Fibers and its Influence on Skin-Clothing Microclimate	Malgorzata Zimniewska	Book of Proceedings of Textile Science & Economy Symposium	3 <sup>rd</sup> Symposium 22.01.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	89-96		no
9	A Thermal Degradation Study od Organophosphorus Flame Retardant Treated Cotton Fabrics	Andrea Katović	Book of Proceedings of Textile Science & Economy Symposium	3 <sup>rd</sup> Symposium 22.01.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	143-1146		no
10	Influence of the pH value on the Crosslinking of Non-Halogenated Hydroxy-Functional Organophosphorus Agent with Cellulose Materials	Sandra Flinčec Grgac	Book of Proceedings of Textile Science & Economy Symposium	3 <sup>rd</sup> Symposium 22.01.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	135-1138		no
11	Design and Engineering of Textile Products from Functionalized Cotton Knitted Fabrics	Zorana Kovačević	Book of Proceedings of Textile Science & Economy Symposium	3 <sup>rd</sup> Symposium 22.01.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	223-226		no
12	Unlocking the Croatian Textile Research Potentials	Sandra Bischof Vukušić	Book of abstracts: Week of Innovative Regions	15-17.03.2010.	Spanish Ministerio de Ciencia e Innovación	Granada	2010	Poster section		no
13	Esterification of Citric Acid and Cellulose in the presence of Zeolite	Sandra Flinčec Grgac	CD ROM 16 <sup>th</sup> International Zeolite Conference IZC-IMMS & Pre-Conference School	2-03.07.2010	International Zeolite Association (IZA)	Italy	2010	CD ROM		no
14	Surface modification of PLA polymer with silver nanoparticles	Marina Turalija Sandra Bischof Vukušić	Book of abstracts Textile Days	23.09.2010	Croatian Association of Textile Engineers	Zagreb	2010	20		no

		Sabyasachi Gaan			(HIST)					
15	Re-thinking of NiTi Alloys for textile applications	Elena Turco	Book of Proceedings of ITC&DC	4 <sup>th</sup> ITC&DC Conference 3.10.- 6.10.2010.	University of Zagreb Faculty of Textile Technology	Zagreb	2010	901-906		no
16	Textile testing for degradation of air cargo nets	Petra Franitza	Book of Proceedings of ITC&DC	4 <sup>th</sup> ITC&DC Conference 3.10.- 6.10.2010.	University of Zagreb Faculty of Textile Technology	Zagreb	2010	576-581		no
17	Testing of Personal Protective Equipment (PPE) against the thermal hazard of an electric arc	Romy Naumann	Book of Proceedings of ITC&DC	4 <sup>th</sup> ITC&DC Conference 3.10.- 6.10.2010.	University of Zagreb Faculty of Textile Technology	Zagreb	2010	678-683		no
18	Sol-gel and Plasma technologies applied to textiles	Jordi Mota	Book of Proceedings of ITC&DC	4 <sup>th</sup> ITC&DC Conference 3.10.- 6.10.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	351-355		no
19	Evaluation of garment effect on physical endurance of sportsmen	Malgorzata Zimniewska	Book of Proceedings of ITC&DC	4 <sup>th</sup> ITC&DC Conference 3.10.- 6.10.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	540-548		no
20	Nanotechnology application for flax yarn for antibacterial socks	Edyta Bogacz	Book of Proceedings of ITC&DC	4 <sup>th</sup> ITC&DC Conference 3.10.- 6.10.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	413-417		no
21	Antimicrobial Polylactide	Marina Turalija	Book of Proceedings of ITC&DC	4 <sup>th</sup> ITC&DC Conference 3.10.- 6.10.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	160-165		no
22	Zeolites in esterification of Citric acid and cellulose	Andrea Katović	Book of Proceedings of ITC&DC	4 <sup>th</sup> ITC&DC Conference 3.10.- 6.10.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	330-334		no
23	Scale's Morphology -	Edita	Book of	4 <sup>th</sup> ITC&DC	University of	Zagreb	2010	187-192		no

	Powerful Tool in Forensic Identification of Wool Fibres	Vujasinović	Proceedings of ITC&DC	Conference 3.10.- 6.10.2010	Zagreb Faculty of Textile Technology					
24	Ageing Effect on Wettability Properties of Low-Pressure Plasma-Treated Cellulosic Fabrics	Sanja Ercegović Razić	Book of Proceedings of ITC&DC	4 <sup>th</sup> ITC&DC Conference 3.10.- 6.10.2010	University of Zagreb Faculty of Textile Technology	Zagreb	2010	570-575		no
25	Spectra Sailcloth – How Strong and Stretchy it can be?	Edita Vujasinović	Conference Handbook Advanced Materials and Nanotechnology	5 <sup>th</sup> Conference (AMN-5) 7.2-11.2.2011.	The MacDiarmid Institute for Advanced Materials and Nanotechnology	New Zealand	2011	C4.2 p.21		no
26	Microcapsules Quantification using Streaming Potential Method	Tanja Pušić	AATCC Riview	No. 5	AATCC	Research Triangle Park NC, USA	2011	68-73		no
27	Evolved Gas Analysis and Flame Retardant Characterisation of Textiles Treated with Organophosphorus Based Compounds	Sandra Bischof Vukušić	Book of Proceedings of The World Congress on CBRN: Threat and Terorism	CBMTS-Industry VII 10.4.- 15.4.2011	Organizers of CBMTS Industry VII	Cavtat	2011	293-300		no
28	Evaluating seam performance in protective clothes	Edita Vujasinović	Book of Proceedings of The World Congress on CBRN: Threat and Terorism	CBMTS-Industry VII 10.4.- 15.4.2011	Organizers of CBMTS Industry VII	Cavtat	2011	301-307		no
29	Strategic Planning and Implementation of the Croatian Anthropometric System	Darko Ujević	Textile Bioengineering and Informatics Symposium Proceedings	TBIS 27-29.05.2011.	Beijing Institute of Fashion Technology	Beijing	2011	6-11		no
30	Preparation of zeolite coated cotton fabrics	Sandra Flinčec Grgac	Proceedings of AUTEX 2011	11 <sup>th</sup> AUTEX 8.06- 10.06.2011	AUTEX	Mulhouse	2011	1069-1075		no
31	Electrospinning of Polyurethane/	Emilija Zdraveva	Proceedings of Oral	20-22.10.2011.	Namuk Kemal University	Istanbul	2011	13-20		no

	Poly(ethylene oxide)System		Presentations ICONTEX 2011							
32	Application of Phase Change Materials for Textiles	Eva Magovac Sandra Bischof Vukušić	Tekstil Vol. 60	No. 2-3	Croatian Association of Textile Engineers	Zagreb	2011	102-108		no
33	Citric acid crosslinking of cellulose in the presence of zeolite FAU	Sandra Flinčec Grgac, Andrea Katović, Drago Katović, Sandra Bischof Vukušić	Book of Abstracts of XXII Symposium of Croatian Chemists and Chemical Engineers	13 <sup>th</sup> – 16 <sup>th</sup> February 2011	Croatian Society of Chemical Engineers and Technologist	Zagreb	2011	260		no
34	Cutting a dash	Sandra Bischof Vukušić	International Innovation ISSN 2041-4552	No. 5	Research media	Bristol UK	2011	77-79		
35	Microencapsulation of cotton fabric with triphenylphosphate based FR agent	Eva Magovac Petra Forte Tavčer	Proceedings of 42 <sup>nd</sup> Symposium of Novelities in Textiles	02.06.2011.	University of Ljubljana	Ljubljana	2011	197-203		no
36	Poly lactide: Antimicrobial modifications	Marina Turalija, S. Gaan S. Bischof V.	Book of Abstracts of eCM XII: Implant Infection	22 <sup>nd</sup> -24 <sup>th</sup> June 2011	AO Research Institute Davos	Davos	2011	41		no
37	Young Scientists in the Protective Textiles Research	Bischof Vukušić, S., Katović, D.	Book: ISBN 978-953-7105-41-9	/	University of Zagreb TTF	Zagreb	2011	586 pages		no
38	Performance of Flame Retardant Finishing Consisting of Dimethyl (N-hydroxymethyl-carbamoyl-ethyl) Phosphonate (DMPA) and Citric Acid	Sandra Bischof Vukušić	AATCC Review	No 1/2	AATCC	Research Triangle Park NC, USA	2012	51-56		no
39	SEM Characterisation of the Cellulose Material treated with Polycarboxylic Acid and Zeolite Nanoparticles	Sandra Bischof Vukušić	Material Science Forum, Vol. 700	5 <sup>th</sup> Conference (AMN-5) 7.2-11.2.2011.	Trans Tech Publications	Switzerland	2012	203-206		no
40	Functional Protective Textiles	Bischof Vukušić	Scientific book	/	University of Zagreb	Zagreb	2012	466 pages		no



			ISBN 978-953-7105-45-7		TTF					
41	T-Pot Monograph	Bischof Vukušić	Book ISBN 978-953-7105-46-4	/	University of Zagreb TTF	Zagreb	2012	252 pages		no
42	Dissemination conference of T-Pot project	Sandra Bischof Vukušić	Suvremena trgovina	No. 1	Seniko studio	Zagreb	2012	34-35		no
43	Comparison of Spanish broom ( <i>Spartium Junceum</i> L.) and flax ( <i>linum usitatissimum</i> ) fibre	Zorana Kovačević, Sandra Bischof Vukušić, M. Zimniewska	Accepted for the publication in Textile Research Journal	/	SAGE	USA	2012			no

## SECTION B

**TEMPLATE A2: LIST OF DISSEMINATION ACTIVITIES**

NO.	Type of activities	Main leader	Title	Date	Place	Type of audience	Size of audience	Countries addressed
1	Kick-off meeting	University of Zagreb TTF	Unlocking the Croatian Textile Research Potentials	02.03.2009	Zagreb	Project participants	20	Croatia, Germany, Poland, Italy, Spain, Belgium
2	Presentation at SEETAL project workshop	Croatian Association of Employees	Possibilities of participation of Croatian SMEs from textile/leather sector in FP7 programee	05.03.2009	Zagreb	Wider public	50	International event
3.	Presentation at 4 <sup>th</sup> Meeting of Bussines-Academy Club	Croatian Chamber of Commerce	Intensification of cooperation between business&academy sector in context of T-Pot project	07.04.2009	Zagreb	Wider public	50	Domestic event
4	Presentation at SEETAL project workshop	Croatian Association of Employees	Successful TTF's R&D projects at TTF-a in cooperation with textile and leather industry	27.05.2009	Zagreb	Wider public	50	International event
5	Workshop at LEITAT	LEITAT, Spain	Innovative Textile Functional Finishing	16-19.06.2009	Terassa Spain	Project members	20	Spain, Croatia
6	Workshop Innovation	TTF & Croatian Chamber of Commerce (EEN)	The role of the innovations, in particular for textile/clothing and ICT sectors	21-23.09.2009	Zagreb	Wider public	100	Croatia, Slovenia
7	Presentation at FP7-SME-2007-2 SMILES project workshop	University of Zagreb TTF	TTF as partner on European projects	25-26.09.2009	Zaton	Wider public	50	Domestic event
8	University of Zagreb Dies Academicus (DA)	University of Zagreb	Presentation of awards for successfull participation at ERA and strengthening of UniZG	03.11.2009	Zagreb	University of Zagreb members	100	Croatia

9	Presentation at Swiss Federal Laboratories	University of Zagreb, TTF	Presentation of T-Pot project / Possibilities of scientific cooperation with TSRC	17-19.11.2009	St. Gallen, Switzerland	Department members	20	Swiss
10	Workshop at STFI	STFI, Germany	Technical Textiles	29.11-4.12.2009	Chemnitz, Germany	Project members	20	Germany, Croatia
11	Presentations at Textile Science & Economy 2010 Conference and Round Table	University of Zagreb TTF 9 T-Pot participants had presentations	Presented in A1	22.01.2010	Zagreb	Wider public	200	International event
12	Presentation at national TV channel HRT1	Croatian national television	Trenutak spoznaje	4.3.2010. 14.40	Zagreb	Wider public	/	Domestic audience
13	Presentation at AATCC 2010 Conference: Innovation and Sustainability Bring New Life to Textiles	2 T-Pot participants had oral presentations, published in CD and later in AATCC journal	Presented in A1	18-20.05.2010	Atlanta, GA USA	Wider public	200	International event
14	Round table: Nanotechnology – New Challenge for the Republic of Croatia	Institute Rudjer Boskovic	Application of Nanotechnology in Textile Materials	27.05.2010	Opatija	Open for public	50	Domestic audience
15	Workshop at Grado Zero Espace (GZE)	GZE, Italy	Functional Design	27-28.05.2010	Montelupo Italy	Project partners	10	Closed for public
16	10 <sup>th</sup> International Foundrymen Conference	Faculty of Metallurgy	Presentation of TSRC at the Conference Exhibition	10-12.06.2010	Opatija	Open for public	100	International event
17	Workshop at Institute of Natural Fibers & Medicinal Plants (INFMP)	INFMP, Poland	Natural fibers and fibers reinforced composites	15-17.06.2010	Poznan, Poland	Project partners	20	Closed for public
18	FP7 Workshop	University of Zagreb Faculty of Electrical Engineering and Computing	T-Pot Case Study	29.06.2010	Zagreb	Wider public	100	Open for public
19	Presentations at ITC&DC 2010 Conference	8 T-Pot participants had lectures/posters	Presented in A1	3-6.10.2010	Dubrovnik, HR	Wider public	300	International event
20	18 <sup>th</sup> Annual Meeting of Croatian Microscopy Society	Eva Magovac	Examples of SEM and EDX Sample Analysis	26.11.2010.	Sisak	Wider public	150	Croatia, Slovenia
21	Presentations at AMN-5 Conference	Edita Vujasinovic S. Bischof Vukusic	Presented in A1	7-11.2.2011.	Wellington	Wider public	700	International event
22	Presentations at CBMTS Conference	Edita Vujasinovic S. Bischof Vukusic	Presented in A1	10-15.04.2011.	Cavtat	Wider public	200	International event

23	Science-professional workshop	Association Gacanka & Croatian Association of Textile Engineers	Protective Properties of Natural Dyestuff	18.04.2011.	Otočac	Wider public	100	Domestic audience
24	Presentation at TBIS Conference	Darko Ujević	Presented in A1	27-29.5.2011.	Beijing	Wider public	500	International audience
25	Presentation at AUTEX Conference	Drago Katović	Presented in A1	8-10.06.2011.	Mulhouse	Wider public	250	International audience
26	Participation at Regional Competitiveness Initiative (RCI)	Martinia Ira Glogar	Working group on Innovation	8-10.06.2011.	Split	Wider public	100	Regional event
27	TSRC Award Ceremony at the Rectorate of University of Zagreb	University of Zagreb TTF	Young Scientist in the Protective Textiles Research	18.07.2011.	Zagreb	Wider public	75	Domestic audience
28	Initiation of partnership with the Institute for Adriatic Crops and Karst Reclamation	Association Porart	Revitalization and protection of traditional values	7-11.09.2011	Split	Internal meeting	10	Closed for public
29	COST Training School: New technologies for treatments in the end-of-use of packaging materials	University of Zagreb Faculty of Graphic Art	Importance of EU projects for Academic sector	12-15.09.2011	Zagreb	Open to public	50	Students
30	Seminar: Chemical Analysis of Polymeric Materials Using Infrared Spectroscopy	University of Zagreb TTF & The University of Georgia, USA	<ul style="list-style-type: none"> <li>• Basic Theory of Infrared Spectroscopy</li> <li>• Applications of FT-IR Spectroscopy to Polymers</li> </ul>	7-11.09.2011	Zagreb	Open to public	100	Croatia, Slovenia
31	Oral presentation at International Congress of Innovative Textiles ICONTEX 2011	Emilija Zdraveva 1 <sup>st</sup> Award at TSRC Competition PhD student category	Electrospinning of Polyurethane/ Poly(ethylene oxide)System	20-22.11.2011	Istanbul	Wider public	500	International event
32	Poster presentation at International Congress of Innovative Textiles ICONTEX 2011	Jelena Hačko 1 <sup>st</sup> Award at TSRC Competition Student category	Effectiveness of fixation of Carboxylic acid on cotton substrate using Low-pressure plasma	20-22.11.2011	Istanbul	Wider public	500	International event
33	19 <sup>th</sup> Annual Meeting of Croatian Microscopy Society	TTF is hosting the event	Microscopy at TTF Presentation of laboratories funded by T-Pot	2.12.2011	Zagreb	Wider public	75	Croatia, Slovenia
34	Professional conference: News in legislation for safety at work, fire protection, rescue, environment protection & personal protective equipment and resources	SME Hemco, Đakovo	Cooperation with industry in protective textiles within the FP7 – REGPOT:T-Pot project	2.12.2011	Đakovo	Open to public	200	Croatia, Slovenia

35	Textile Forum	Cotton Incorporated, USA & TTF	<ul style="list-style-type: none"> <li>• Cotton Incorporated: Corporate Overview</li> <li>• Cotton's Market Presence in Women's Wear</li> </ul>	30.01.2012	Zagreb	Open to public	50	Domestic public
36	European SME Week 2011	Croatian Chamber of Economy Karlovac County	FP7 Programme for strengthening of R&D of innovative SMEs	8.12.2011	Karlovac	SMEs	50	Domestic event
37	Press conference prior to Dissemination Conference	Press	Impact of T-Pot project on Croatian SMEs and craft	14.02.2012	Zagreb	Wider public	20	Domestic event
38	Dissemination Conference & Exhibition of SMEs in the sector of Protective Textiles	University of Zagreb & Croatian Chamber of Trades and Craft	<ul style="list-style-type: none"> <li>• T-Pot project results and future development of TSRC</li> <li>• Impact of T-Pot project</li> </ul>	16.02.2012	Zagreb	Wider public	150	Domestic event
39	Presentation at national TV channel HRT1	Croatian national television	Craftmen&Partner	18.02.2012	Zagreb	Wider public	/	Domestic event
<b>FURTHER ACTIVITIES</b>								
40	7 <sup>th</sup> ETP Annual Public Conference	EURATEX	From FP7 to Horizon 2020 Making European Research & Innovation Programmes fit for SMEs	29-30.03.2012	Brussels	Wider public	200	International event
41	Lectures organized by Prof. David Hui, University of New Orleans, LA	University of Zagreb TTF	Nano-engineered mechanics: Why Nano?	07.05.2012	Zagreb	Wider public	100	Domestic event
42	Textile Forum organized by representative of Schoeller	Schoeller Textiles, Switzerland	Power of Innovation	14.05.2012	Zagreb	Wider public	100	Domestic event
43	Textile Forum organized by representative of Du Pont	DuPont	Science Powered Innovation Safety & Protection	21.05.2012	Zagreb	Wider public	100	Domestic event
44	Invited presentation at International Conference on Composites or Nano Engineering - ICCE-20 (Chair person: Prof. D. Hui)	1 T-Pot participant will hold a lecture	Thermal and morphological properties of <i>Spartium junceum</i> fiber-reinforced green composites	22-28.06.2012	Beijing	Wider public	1000	International event