INNOSTORAGE – USE OF INNOVATIVE THERMAL ENERGY STORAGE FOR MARKED ENERGY SAVINGS AND SIGNIFICANT LOWERING CO_2 EMISSIONS

Beneficiaries:

Partners:

	Name and Institution	Date
Prepared by:	Ms. Esther Galindo	22 May 2017
Checked by:	Dr. Jay khodadadi Auburn University	
Approved by:	Prof. Dr. Luisa F. Cabeza Universitat de Lleida	

Contents

1 Objectives

This report reflects the results of secondment done by Ms Esther Galindo from the University of Barcelona (Spain) that visited Prof. Dr. Jay Khodadadi at the University of Auburn (USA) from the 14th of January until the 13th of February 2017.

The objectives of the two secondments were:

a) To enhance the collaboration between the two institutions with a long term perspective.
b) Assist Auburn University (AU) in searching calls and apply for a financial grant to fund their secondments.
c) To elaborate the reception plan for future incoming
d) Establish collaboration on new projects.

Each of these objectives is developed in the following sections.

2 Collaboration between UB-AU

The first 10 days of the secondmend the Professor Ana Inés Fernández and I were having different meetings first with Prof. Dr. Jay Khodadadi to look for synergies for new projects and second with other researchers and professors from Auburn University as you can see in the following sections.

2.1 Research work with Prof. Khodadadi

Plaster with PCM

Prof. Khodadadi directed the research made by Mathew Perrella "Optimization of micro-encapsulated phase change materials in a model gypsum wall board". From this research, we found interesting common approaches that will lead us to do a comparative study with previous results at UB with gypsum board with microencapsulated PCM.

Molecular Dynamics

Prof. Khodadadi is working with two pot-graduate students in simulations at molecular levels using molecular dynamics computational methods to study the enhancement of thermal conductivity of organic PCM with nanoparticles. In a meeting with his students, we discussed the methodology, the assumptions made in the simulation and the analysis of the results they are achieving.

2.2 Bilateral meeting with different academics

During our secondment we had the opportunity to meet several academics working in closed fields.

Dr. Jeff Fergus is the academic coordinator of the Materials Engineering degree at Auburn University. We discussed the possibility of students' exchanges at post-graduate level and he explain to us the agreements they actually have with European Universities.

Dr. Lorenzo Cremaschi is associate professor in the Mechanical Engineering department and his research focuses in heat transfer and thermal management. While he is not researching in thermal energy storage is was very interested in the possibilities of different storage technologies, to be applied to the systems he is working with.

Prof. Sushil Bahvnani is the Associate Department Chair. We visited his laboratory and kindly explained us the different projects they are carrying in developing different systems for cooling electronics by using fluorinated HTF.

Dr. Pradeep Lall is the Director, NSF-CAVE3 Electronics Research Center, and show us their running projects related with thermo-mechanical reliability of microelectronics under server working conditions.

Dr. Xingyu Zhang main field of expertise is nano-structured polymers, nanocarbons, composites and the related applications in chemical vapor/liquid sensors, organic displays, fuel cells and alternative energy harvesting and storage. He is the inventor of PopTube technology for production of carbon nanotubes (CNT). This microwave based technology made it possible for direct growth of CNT on the surfaces of engineering materials (e.g. carbon fiber, Kevlar, glass fiber, etc.). PopTube technology has great potential for large scale production of CNT based composites, for composite and energy industries.

Dr. Jimmy Mills is associate professor of the Chemistry Department and works with Prof. Khodadadi in the development of nanoparticles to enhance the thermal conductivity. He was also interested in the modelling at molecular level to increase the knowledge of the mechanisms involved at the nanoscale.

Dr. Maria Auad is Associate Professor at the Polymer and Fiber Engineering Departnemt. We visit her lab, and shared experience in polymers and composites characterization and focused our discussion on her work and interest by the work done by Arcade Aerospace, the company we also visited during our secondment.

Dr. Majid Beidaghi is assistant professor in the Materials Engineering Program. We had interest in sharing information about Materials Engineering program. Moreover, Dr Majid acts as a panel member from the program Partnerships for International Research and Education (PIRE) and we had valuable advice from him to prepare a proposal.

2.3 Meeting with students

YI ZENG: who presented his MD work to date

DOURNA JAMSHIDEASLI: who is starting work on high-temperature PCM. We discussed different options to collaborate and share information.

WENWEN YE: who is starting work on modeling of high-temp. PCM using CFD

SHAFKAT BIN HOQUE: who just started graduate study at AU focusing on PCM

EGEMEN CAGLAR: who just started graduate study at AU. She will focus on a project dealing with thermal sciences of oil/gas processing

3 Increase visibility to the research on TES at AU outreach activities

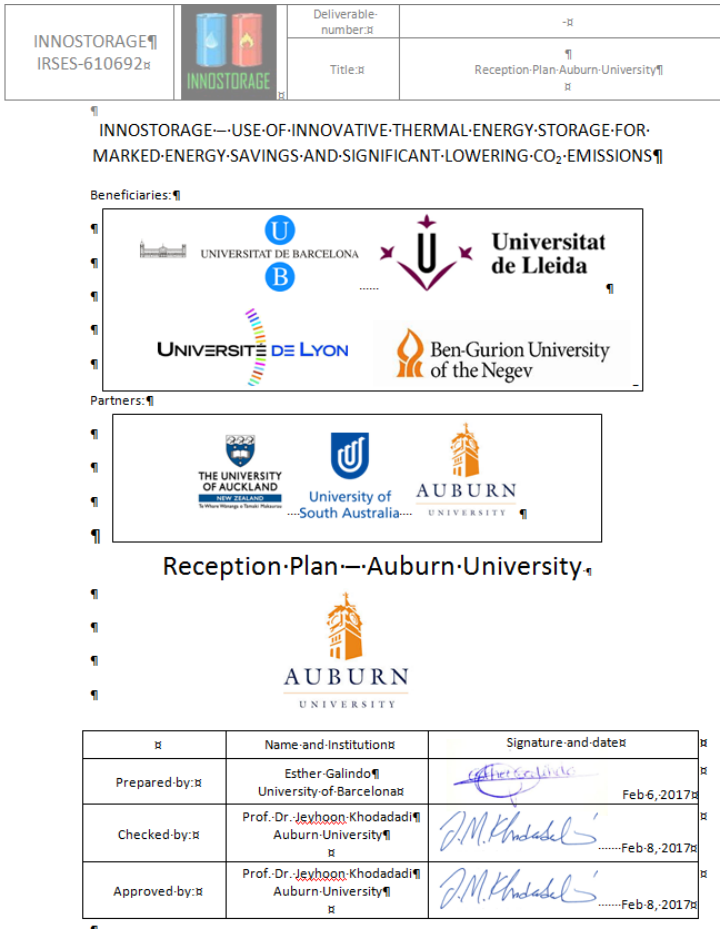
During this period, different outreach activities have been done:

- Seminar at the Department of Mechanical Engineering, AU
  At the time of these secondments we prepared a seminar at the Department of Mechanical Engineering presenting the work in TES at the University of Barcelona. Moreover, the project INNOSTORAGE was also presented. The announcement of the seminar is attached in the Annex of this document. After this seminar, and because of the interest of several attendants, we arrange the bilateral meetings and visits explained.

- Visit at the company Arcade Aerospace.
  On January 23rd we visited the company Arcade Aerospace with Prof. Jay Khodadadi, where we could see all the infrastructures available there. Ms Ramona Bergó was our host; she showed us the possibilities for non-destructive testing NDT of composite materials.

4 Management work description

Ms Galindo was the first person who visit Auburn University from the consortium of the INNOSTORAGE. She wrote the document called “Reception Plan”, a document for helping the researchers of the project to find all that they need to know about the research group, the university, transport, city, where they can find accommodation and other services making their secondment more pleasant.



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Beneficiaries:

Partners:

Reception Plan — Auburn University

	Name and Institution	Signature and date
Prepared by:	Esther Galindo, University of Barcelona	Feb 6, 2017
Checked by:	Prof. Dr. Jeyhoon Khodadadi, Auburn University	Feb 8, 2017
Approved by:	Prof. Dr. Jeyhoon Khodadadi, Auburn University	Feb 8, 2017

Professor Jay Khodadadi, Dr. Fernández and Ms. Galindo had several meetings to apply the next call of Partnerships for International Research and Education (PIRE), as during the meeting with Dr Majid Beidaghi, they got the information that he was one of the experts for evaluating this grant this year. We worked with Prof. Khodadadi in build a proposal to apply to next PIRE call expecting for the next October.

5 Assessment

5.1 Assessment from Esther Galindo

It was a pleasure to spend a month at the Auburn University (AU) in Alabama under the supervision of Prof. Jay Khodadadi. It was a very profitable experience to learn about the different types of grants and calls, which we can apply for new research and teaching project together. Working in another country has allowed me to discover different ways of working and improving my communication and writing skills in English. Besides, I would like to thank Professor Khodadadi and the staff of the AU who help me and make my secondment pleasant.