VIPP VALUES CREATED IN FIBRE-BASED PROCESSES AND PRODUCTS

THE VIPP NEWSLETTER #2

VIPP STANDS FOR **VALUES CREATED IN FIBRE-BASED PROCESSES AND PRODUCTS** AND IS AN INTERDISCIPLINARY, INDUSTRIAL GRADUATE RESEARCH COLLEGE LOCATED AT KARLSTAD UNIVERSITY.

The VIPP research school has commenced its second year and we are proud to say that all PhD students have started their research and dissertation projects. Together with our industrial partners we are proud to present the final four PhD students and their interesting projects in this second issue of our newsletter. You can also keep up to date on our website kau.se/en/vipp.

Our focus is to support our PhD students in order to give them the best possible guidance throughout their projects. Their dissertation projects focus mainly on the pulp and paper industrial branch and key technologies of importance for this industry.

- We aim to create a research environment where PhD students not only specialize in one area, but gain skills in other research areas as well. We see collaboration, courses and close contact within the network as vital components to achieve this, says program director professor Lars Järnström at Karlstad University.

Three strong research themes form the basis of VIPP:

- Pulp, paper and graphic technologies
- Environmental and energy
- Service oriented customer research activities

The VIPP research school is a joint venture between Karlstad University – Department of Material Science, Department of Energy, Environmental and Building Techology and The Service Research Centre – and the following companies: Asko Appliances AB, Billerud AB, BTG Instruments AB, Metso Paper Karlstad AB, Domsjö Fabriker AB, Eka Chemicals AB , MoRe Research AB, Innventia AB, Korsnäs AB, Pöyry Sweden AB, SSG Standard Solutions Group AB, Stora Enso Group R&D, Stora Enso Skoghall AB and Kemira Kemi AB. Together these partners share a wide variety of complementary expertise, covering the whole value chain from pulp to final product. The program is financed by the participating partners and the Knowledge Foundation.

KAU.SE/EN/VIPP

KK-stiftelsen

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RENEAWABLE PACKAGING MATERIAL

Today's materials used for food packaging are mostly oil-based polymers as barrier materials. Over the last ten years efforts has been made to replace the oil-based polymers with environmentally friendly bio-based polymers, keeping in mind the recycling and reuse of food packaging material. The purpose of barrier material is to protect the packaged food from oxygen, water vapor, water and fat.
Starch derivatives have shown good barrier properties against oxygen and fat at low relative humidity. The aim with this project is to generate knowledge about starch based barriers and their application under controlled experimental design and conditions.

Based on this study the major purpose is to improve barrier properties at higher relative humidity as well as mechanical properties. The focus will be on large scale production with maintained product properties.
The project is carried out in collaboration between Karlstad University and Korsnäs AB

Name:	**Muhammad Asif Javed**
Education:	**MSc Chemical Engineering, 2011, Karlstad University**
Supervisors:	**Associate Professor Caisa Johansson** **Dr., Senior Lecturer Henrik Ullsten, Karlstad University** **Professor Lars Järnström, Karlstad University (examiner)**

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SERVICE INNOVATIONS IN INDUSTRIAL NETWORKS

SSG Standard Solutions Group AB works with standardization, recommendations, information and training as well as information and transaction management within the business areas Technology, Logistics & Purchasing plus Health, Safety & Environment. Within these business areas there are ten different fields established, where about 500 experts from the forest industry work actively on more than 60 committees and working groups. Their objectives are to strategically and operatively identify important, cost-efficient solutions that heighten quality and are applicable to the entire international process industry.

The purpose of the PhD thesis is to create knowledge on how service innovations emerge and evolve in industrial networks. It will map the important factors and areas central for the development of service innovations. The thesis also aims to follow the development from idea to a commercial service and increase knowledge how the value in use for the customer is created.

Name:	**Per Myhrén**
Project start:	**February 2012**
Supervisors:	**Development Manager Johan Engman (SSG)** **Professor Lars Witell, Karlstad University** **Professor Bo Edvardsson, Karlstad University**

STANDARD SOLUTIONS GROUP

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DESIGN AND UTILIZATION OF A HIGH SPEED CREPING SIMULATOR FOR TISSUE

Creping is a process where the dried tissue is separated from the surface of the Yankee cylinder with the help of a doctor blade. Yankee dryer creping of light weight tissue sheets is used extensively in the paper business to impart softness and bulk to bath tissue and facial tissue and towel products.

Critical to the creping operation are among others the strength of attachment of the tissue sheet to the Yankee dryer and the angles and forces exerted on the sheet during the creping operation. Higher attachment strength typically translates into higher creping energies and higher bulk and better softness. Higher speeds (higher forces) and tighter angles also influence the resultant properties of the creped sheet. Typical production tissue machines operate at speed over 1000 (meters per minute) mpm up to 2000+ mpm.

Trials on production tissue machines are fraught with potential difficulties because they jeopardize a critical piece of production equipment (the Yankee Dryer) that is both very difficult to repair and very time consuming to replace. This problem is especially evident when the trial incorporates true research where the trial outcome might jeopardize the structural integrity of the equipment.

In these cases, the first stage evaluation on a simulator or pilot line is especially advantageous. Normally creping evaluations start with handmade sheets and stationary (or very slow) sheet drying and creping and progress to faster operations once trials results become known. Nevertheless, any trial evaluations that are completed with processes that are only estimates of commercial operations or are completed at speeds that are orders of magnitude slower than commercial operations are suspect with respect to their applicability to commercial operations.

Therefore there is a need to a pilot line creping machine that incorporates close similitude of commercial equipment at speeds commensurate to commercial speeds.

Name:	**Pyry Hämäläinen**
Education	**Master of Engineering in Paper Technology, HM Germany**
Company:	**Kemira**
Project start:	**February 2012**
Supervisors:	**Associate Professor Nils Hallbäck, Karlstad University** **Dr. Christophe Barbier, Karlstad University**
Examiner:	**Professor Lars Nilsson, Karlstad University**
Mentor	**Henry Skoog, senior research scientist, Kemira**

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OXIDATIVE PRETREATMENTS WITH THE INTENTION TO FACILITATE THE MICROFIBRIL SEPARATION AND LOWER THE ENERGY DEMAND

Microfibrillated celluloses (MFCs), and nanofibrillated celluloses (NFs) can be prepared from wood and non-wood pulp fibers by intensive mechanical treatment in for example a microfluidizer or a microgrinder. During the mechanical treatment, the microfibrils are separated from the fiber structure. Mechanical treatment alone is often considered to be highly energy consuming and too insufficient, leaving untreated fibers, fiber fragments and bundles of unfibrillated microfibrils in the products. The focus of my Ph.D.work will be on oxidative pretreatments, preferably with hydrogen peroxide and chlorine dioxide with the intention to facilitate the microfibril separation and lower the energy demand.

I started the work in the beginning of this year and have spent most of the time reading literature and writing a literature report and have therefore just started with laboratory work.

Name:	**Pia Hellström**
Company:	**Eka Chemicals**
Supervisors:	**Dr. Helena Håkansson, Karlstad University**
	Magnus Paulsson (Eka Chemicals)
	Anette Heijnesson-Hulten (Eka Chemicals)