

In touch with digital printing

STFI-Packforsk Örnsköldsvik in co-operation with academia and industry, page 4





Ewa Lie and Anne Stockenberg are two of the researchers at the STFI-Packforsk microbiology laboratory. According to them, the laboratory is expertly equipped to carry out all kinds of microbiological analyses.

Is there life in paper?

Is there life in paper after a paper machine? This question may be answered in various ways, e.g. a paper's manner of expressing itself or its tendency to change.

The expert microbiologists at the STFI-Packforsk microbiology laboratory study the life that, of itself, exists in paper; micro-organisms that can not only be injurious to health when coming in contact with food products but that may cause costly interruptions to production in the manufacturing processes. There are certain organisms that can even form resistant spores. These are called endospores and may remain even after the drying section of a paper machine.

"One sign of the survival capability of an endospore is that they are what researchers are in quest of, when looking for life on Mars," says Ewa Lie who is responsible for work in the microbiology laboratory. "Micro-organisms can be the cause of slime being formed which, in turn, can give rise to spots or holes in a paper and, in the worst instance, cause a web break. They can also cause corrosion damage to process equipment."

According to Ewa Lie, it is quite common for a mill to try to elude a problem

by adding more chemicals to stop the work of the organisms. This, however, is merely a way of treating the symptom rather than curing the cause of the disease.

If there are problems with processes or production, it can be beneficial to carry out a system analysis to find potential problem organisms.

"In principal, this means looking at the process equipment with microbiological eyes," adds Ewa.

Since micro-organisms are living matter that perform differently, depending on their environment, there cannot be a common solution to every problem. By using tailor-made methods adapted to the environment of a particular mill, there is a better chance of finding the source of a problem in the microbiology laboratory.

One of the latest methods is to look at non-cultivable

bacteria with the assistance of molecular methods.

Customer demands on foodstuff packaging, without the presence of substances hazardous to health, has put focus on production processes but from a microbiological perspective.

Ewa concludes, "At STFI-Packforsk, we are more than prepared to meet new demands from the industry for excellent and reliable testing methods based on our frontline research." ●

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Det mikrobiologiska laboratoriet vid STFI-Packforsk studerar de levande mikroorganismer som finns i papperet och som inte bara kan vara hälsovådliga i kontakt med livsmedel utan också kan orsaka kostsamma produktionsstörningar i tillverkningsprocessen som t ex slembildning och korrosionsskador. En vanlig åtgärd är att tillsätta kemikalier för att stoppa organismerna, säger Ewa Lie som leder arbetet inom laboratoriet, men enligt henne botar man då endast symptomen. Ett bättre sätt är att göra en systemanalys för att hitta eventuella problemorganismer.

Eftersom mikroorganismer är levande materia som uppträder olika beroende på omgivningen, kan man inte ha en generell lösning för varje problem. Genom skräddarsydda metoder som är anpassade för det enskilda brukets miljö, har man på mikrobiologilaboratoriet bättre möjligheter att hitta källan till problemen.

Profile



Anne Stockenberg

Anne Stockenberg is a Major Project Manager and one of the experts at STFI-Packforsk in the field of microbiology. Working with the forest industry was something quite new to her when she took up her appointment in the Company three years ago. During her time at the Microbiology Department at Stockholm University, it was the sea rather than the forest that was her focus when she studied how microbial processes in the sediment affect eutrophication in the Baltic Sea, among other things.

When asked why it is interesting to work with micro-organisms, she replies that they are fascinating.

"It is an invisible world that influences an incredible number of things," she says.

She describes an old branch of learning with classical methods that have undergone developments in the last thirty years through the influence of molecular biology. It has provided us with new tools for studying micro-organisms. As a result, it is possible to see that the microbial world is more sophisticated and diverse than was previously believed.

"New species and types have been discovered, which has meant, among other things, that the evolutionary development tree has had to be redrawn," she says.

Anne began her studies in humanities, with a deep interest in languages. After this, she spent many years abroad, in Chile, Algeria and Cuba. However, when she changed her profession to science in 1987, it was as if an entirely new world had opened up to her. Nevertheless, she views her humanities background as a complete asset. It makes it possible for me to have a broader perspective, to see problems from different aspects."

Her interest in biology is given further expression when, in her leisure time, she likes to potter in her own garden at her country place in Västmanland. ●

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EU Standards finally aligned

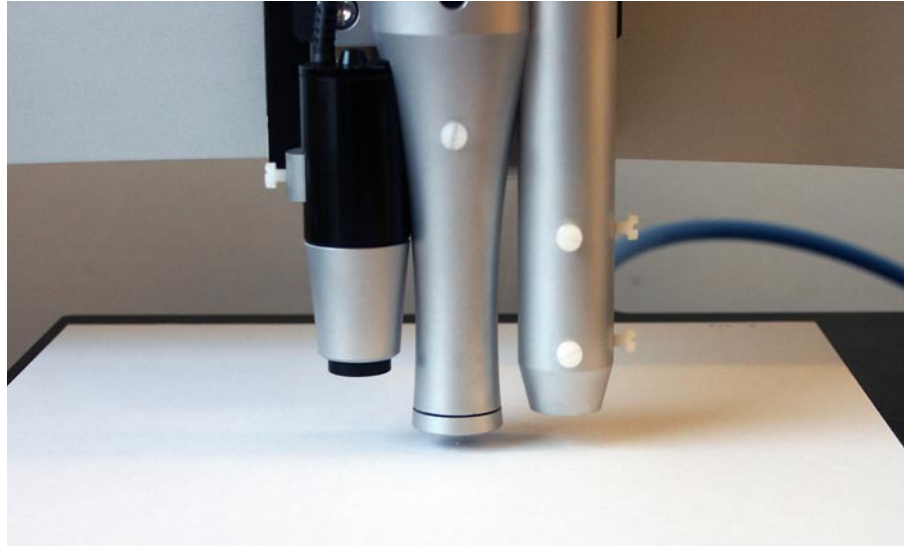
After many years, the six standards that the European Standardisation Organisation had set up as methods for companies to demonstrate that they conform to the EU Packaging Directive, have been brought into line by the EU Commission. This means that there is now an authoritative-ly approved method to show that a package accords with the so called Essential Requirements of the EU Directive. This also indicates that every European country has to establish a course of action in accordance with the standards.

Due very much to the involvement of STFI-Packforsk, Sweden is one of the leading countries to be actively involved in the ground work with these Standards.

“Our starting point was to create practical standards instead of general guidelines,” says Ann Lorentzon who, together with Anders Sörås, has worked on the requirements of the Standards. “This involves a constant questioning of packaging while, at the same time, it opens up the possibility of future solutions involving new materials or functions.”

This involvement has resulted in the creation of the Trade and Industry Miljöpack Group that supports companies in their work to adapt their Q.A. systems to conform to the Standards. ●

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New instrument

STFI-Packforsk has recently invested in a new surface profilometer, called FRT after Fries Research & Technologies, a German manufacturing company. The instrument works on the chromatic aberration principle. This is an optical non-contact method where the colour composition of the reflected light is analysed and translated into a height position, similar to confocal microscopy.

The instrument is equipped with a topography sensor and a CCD camera, which is used to define start and end positions for a measurement, by locating marks or printed areas on the surface, for example.

The data is evaluated in separate software, where common surface parameters, height maps, profiles and pictures are generated. Raw data can be exported for custom data evaluation in Matlab, for instance.

Up to now, FRT has been tested on uncoated and coated papers, metal, PE coated board and marble. ●

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Inkjet leaving its imprint

The STFI-Packforsk regional establishment in Örnköldsvik is working with several interesting projects. Marianne Klaman, a Major Project Manager in Stockholm, is responsible for the research programme in Örnköldsvik. She emphasises three current projects that are in line with STFI-Packforsk operations and that fortify the Company's expertise.

High quality printing with inkjet

With inkjet technology, it is possible to print out colour pictures with the best quality, even at home. Researchers have had photos developed from a digital source at a conventional photo lab and compared them with the same photos that have been printed out on three different inkjet printers.

Inkjet printouts have a very wide col-

our range as well as a good colour reproduction, in most cases, with as good as or better quality as the conventionally developed photos. Uniformity and the reclamation of detail have been good too.

For a printout, the software in a printer is used and the programmes from the different suppliers can differ slightly. There is always a continual upgrading and the developments go swiftly. Achieving the best quality requires an increasing level of know-how by the user. The technology is relatively expensive. Anyone who changes an ink cartridge in their printer at home is only too well aware of this fact.

The project was launched with a broader pre-study and has consequently been run in collaboration with M-real which has digital printing as one of ▶



► its interests. A report will be produced before June. It is awaited with anticipation by the paper industry, photo labs and companies that have a niche in the field of photo printouts.

Hybrid printing

Another project concerns the combination of conventional flexography with inkjet. There is an increase in flexibility and the opportunities of tailor-making the product to the needs of the customer when utilising fill-in printing with inkjet at the end of the production line.

Marianne Klamann means that STFI-Packforsk is in a good position these days with this project and that there is a lot to bring to this area. The big developers are working with this and, so far, it is a small but significant niche, especially of interest when it comes to the field of packaging.

Packaging material is often adapted for a certain printing technique, giving completely different results with another technique. There is still a great deal of delicate problems to find solutions to.

Xerography on PE coated surfaces

In the third example, some research has been carried out on ream wrapping (the somewhat stiffer paper around a sheaf of copying paper) with xerography, which leads to the possibility of personalised printing.

Marianne Klamann certainly wants to take things further in this area. The interesting thing about this is combining technology with materials. This will probably interest the packaging market when it comes to PE coated board and other PE coated materials. ●

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STFI-Packforsks forsknings-etablering

i Örnsköldsvik omfattar flera intressanta projekt, exempelvis High quality Printing med inkjet, hybridtryck samt xerografi på polyetenbelagda ytor. Med inkjet teknik är det möjligt att printa ut färgbilder med den bästa kvalitet på vanliga bläckstråleskrivare. Utskrifterna i projektet som har drivits i samarbete med M-real, har haft ett mycket stort färgomfång, även färgåtergivning i de flesta fall, och minst lika bra kvalitet eller till och med bättre än konventionellt framkallade foton. Att kombinera konventionell flexografi med inkjet är en smal men mycket betydande nisch som är intressant framför allt för förpackningsområdet. Med tilltryck i inkjet sent i fyllningslinjen ökar flexibiliteten och möjligheten att kundanpassa produkten. I det tredje exemplet, xerografi på polyetenbelagda ytor, har viss forskning gjorts på risomslag, vilket ger möjlighet till personifierade tryck. Det intressanta är att kombinera teknik och material.

In touch with digital printing

Digital printing technology is one recent contribution to the STFI-Packforsk business. It is a technology that is gaining strong ground offering a lot of advantages and new business opportunities.

“One way for paper mills and the packaging industry to discover new business opportunities is to develop products suitable for digital printing. This naturally requires knowledge about this printing technique,” says Malin Wedin who is the regional contact person in Örnsköldsvik.

Some years ago, a regional Competence Centre for digital printing technology, DPCOM, was founded. It comprises the Digital Printing Center (DPC), the Mid Sweden University in Sundsvall and STFI-Packforsk. M-real, SCA and the printing industry in the region, among others, are behind the investment. Its aim is to strengthen the competitiveness of the industry through research and development and by making evaluations of the technology and the market.

“This is a good example of how academies, institutes and companies from various fields can work together to attain further heights,” says Clas Engström, Operations Manager at DPC.

When DPCOM was founded, the motto was, “We will not be in competition but invest in a joint Competence Centre instead.” A new printing laboratory has been built, with climate control equipment that makes it possible to regulate the temperature and relative humidity when printing is in progress. For paper, environment is very significant since the quality and condition of a paper has an effect on the printing.

“STFI-Packforsk now finds itself in a strong position, with paper, packaging and printing on its programme,” adds Malin Wedin.

In its simplest form, digital printing has been around since the 1980s. Many people must surely remember receiving those initial direct-addressed letters containing advertising matter. The tech-

nology of today is developing a great deal and it will provide enormous opportunities for high qualitative colour printing with static or variable texts and pictures.

This technology means that each printing can be varied, since it goes directly from a computer to the printing press. With conventional printing methods, there is a middle step using printing plates, and so larger editions are needed for the printing to be profitable.

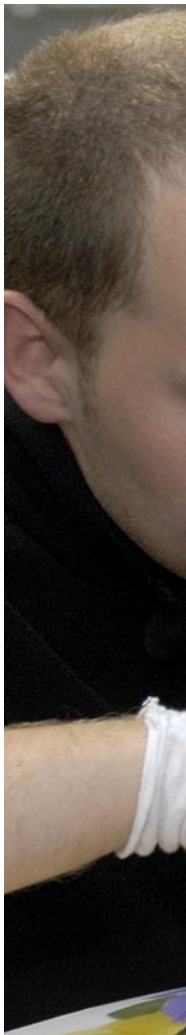
New opportunities

Rapid developments are taking place and a lot is happening in the fields of printing and packaging. The motive forces are many, e.g. the increased speed of information, smaller editions, more specific information, diversified editions and less tied-up capital as a result of a reduction in stock. For companies, this means that they can offer business models and services that are impossible with conventional printing.

This, however, places demands on the papers, the inks, the processing and other things. The STFI-Packforsk Örnsköldsvik staff, consisting of four doctoral candidates, one postdoc and Malin Wedin, work closely with the companies standing behind the Competence Centre. With their colleagues in Stockholm, a great deal of know-how and knowledge about properties, qualities and the evaluation of printing, papers and packages is being developed.

Hybrid printing

“Customer adapted information on packages” is the title of a project that recently





Thomas Mejtoft, Åsa Gidlund, Magnus Viström and Jakob Norstedt-Moberg are doctoral candidates at STFI-Packforsk in Örnsköldsvik.

resulted in a licentiate's dissertation.

Doctoral candidate Magnus Viström says, "The prospect of applying digital printing technology to packages is being studied in this project."

"By way of introduction, we identified the motive forces and limitations by using customer adapted information on packages. Then our focus was on looking at where, in a value chain, a digital fill-in printing can be done and what logical consequences this results in. We have also identified the important critical factors to be aware of when a digital fill-in printing unit is being integrated into a packaging line."

The results show that customer adapted information on packages is of interest in order to comply with the altogether higher market demands on flexibility and short production series and to create customer benefits as well. Magnus Viström suggests that it is feasible to make logistical improvements and to raise the level of delivery services by integrating a digital printing unit inline on a packaging line.

"However, it is vital to keep in mind that a digital printing unit, integrated inline, carries certain risks with it."

Web-to-print

The internet has provided a new potential for ordering printed matter using web solutions. This is called 'web-to-print'. All the programmes and templates are at the printer's and customers are able to fill in a document with their own information. Malin Wedin mentions the production of business cards as an example.

"The printer has a layout template, especially created with the company logo and other static information. Using the internet on their own computers, staff members are able to fill in personal details on the template. When an order has been authorised by someone qualified, printing of the desired number of items takes place."

"This is fast. There is no need for expensive software or a high level of know-how on the part of the customer. It's such a simple business."

Digital technology seems to present unlimited possibilities. Need and technology go hand in hand and any problems are solved along the way. ●

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 **Digital tryckteknik** är ett av de viktiga tillskott till agendan som STFI-Packforsk har fått som storinstitut. Tekniken innebär att varje tryck kan varieras eftersom det går direkt från en dator till tryckpressen.

För några år sedan etablerades ett regionalt kompetenscentrum för digital tryckteknik i Örnsköldsvik, som består av Digital Printing Center (DPC), Mittuniversitetet och STFI-Packforsk. Avsikten är att stärka industrins konkurrenskraft genom forskning, utveckling och utvärdering av marknad och teknologi.

– Det här är ett bra exempel på hur akademi, institut och företag från olika verksamheter arbetar tillsammans för att nå längre, säger Clas Engström verksamhetschef vid DPC.

Drivkrafterna inom trycksaks- och förpackningsområdet är många; ökad informationshastighet, mindre upplagor, mer riktad information, varierade utgåvor och minskad kapitalbindning. För företagen innebär digitaltryck att kunna erbjuda affärsmodeller och tjänster som inte är möjliga med konventionellt tryck.



Participation in the various Research Programmes that have gone from national-based research projects to research on the European market signifies increased opportunities for making contacts with new parties. Aerial view of the M-real Husum Mill.

M-real & network oriented research

“With R & D, our general philosophy and vision is network oriented,” says Sune Wännström, Assistant Vice President of M-real Corporation Centre in Örnsköldsvik. “The institute, the university and the Company are important parties in our research network when it comes to customers and suppliers.”



Sune Wännström, Assistant Vice President of M-real Corporation Centre in Örnsköldsvik has had valuable experience as a Partner Customer at STFI-Packforsk. He regards contract research as an excellent complement for meeting the needs of the different units in the company.

M-real has been a Partner Customer of STFI-Packforsk for many years and, in the latest research programme, it has been an active participant in many of the clusters.

“In principal, it’s only the Newsprint Cluster that we don’t take part in,” says Sune Wännström. “And the reason for that is simply because we don’t produce that kind of paper.”

Valuable experiences

At M-real, they actively participate in the development of the forthcoming three year STFI-Packforsk Research Programme, offering opinions, from the point of view of the Company, on important issues concerning research.

“In addition to participating in the various Research Clusters, our experiences from contract research have been valuable, which has been a good complement,” says Sune Wännström. “Putting aside a portion of our annual financing towards this has worked out extremely well for us. This might include anything from trials on EuroFEX, the STFI-Packforsk paper machine, to visual evaluation with the aid of perception studies.”

More interface

He emphasises the function of the Research Programme concerning the significance of meeting other companies from different parts in the value chain.

This provides more opportunities for interface, which in turn can generate joint development projects.

“Earlier on, there were fewer players on the market and research made a much greater impression nationally. These days all our research investments take place on a European playing board as well as among an increasing level of competition,” adds Sune Wännström. ●

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– **Vår generella filosofi** och syn på FOU är nätverksorienterad, säger Sune Wännström, Assistent Vice President vid M-real Corporation Technology center i Örnsköldsvik. Institut, universitet samt företag på både kund- och leverantörssidan är viktiga aktörer i vårt forskningsnätverk.

M-real är avtalskund hos STFI-Packforsk sedan många år och i det senaste forskningsprogrammet deltar man i många kluster. M-real medverkar aktivt i utvecklingen av det kommande treåriga forskningsprogrammet och ger sin syn på viktiga forskningsrelaterade frågeställningar.

– Förutom att delta i de olika forskningsklustren har vi mycket goda erfarenheter av kontraktforskningen vilket är ett bra komplement, säger Sune Wännström. Det kan vara allt från försök i STFI-Packforsks pappersmaskin EuroFEX till visuell utvärdering med hjälp av perceptionsstudier.

Meet us at SPCI

On Tuesday 14 June, the Stockholm Exhibition Hall opens its doors for a week of pulp and paper at the SPCI Fair, the thirteenth to take place. This international Fair opens on the Tuesday and closes two days later on Thursday 16 June. Having started in 1972, the SPCI Fair is considered to be the biggest trade exhibition for the forest industry anywhere in the world. The number of visitors is expected to reach 20,000 this year.

The Fair invites you, in part, to wander around the 800 exhibitors from the thirty or so countries that have registered and, in part, to attend an extensive conference programme. The conferences have been jointly organised by STFI-Packforsk and SPCI. They have been sponsored by

PI, Finland, PAPTAC, Canada, APPITA, Australia and TAPPI, USA. To see the complete conference programme, visit www.spci2005.com

Make our stand the place to meet. As is tradition, you will get to meet our new company, STFI-Packforsk AB, at SPCI, where we will put an emphasis on presenting our work, our colleagues and our new identity. Our stand is number 18:18 which is strategically placed, close to the Media Centre in Hall A.

Each day of the Fair, we will carry out consecutive mini-seminars on the stand. For ten minutes at a time, we will present the advantages of our research and the tasks we have set ourselves on behalf of our new and old acquaintances.

The spacious stand means that we have plenty of room for you to book a meeting with one or more of our STFI-Packforsk colleagues.

But, one thing is certain... we are looking forward to seeing you at SPCI 2005. ●

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World Pulp & Paper Week



Stockholm · Sweden · June 14-16, 2005

COMING EVENTS

MAY

- 9-12 Packaging Diploma Course, session III
- 10-11 Advanced Training: White water and retention chemistry in closed systems
- 24-25 Advanced Training: Evaluation of print quality

JUNE

- 14-16 SPCI 2005
- 14-16 2005 International Pulp Bleaching Conference

SEPTEMBER

- 20-21 Future Role of Print & Media
- 21-24 GRAFEX
- 28-29 Advanced Training: Stock preparation and fibre properties

OCTOBER

- 3-6 Packaging Diploma Course, session IV
- 4 Research seminar for partners
- 5 T2F mini-seminar on prepress
- 11-12 Advanced Training: Spots and deposits
- 18-19 Advanced Training: Paper surface properties
- 25-26 Advanced Training: Fibre development in mechanical pulping

Future Role of Print and Media Conference

20-21 September, 2005

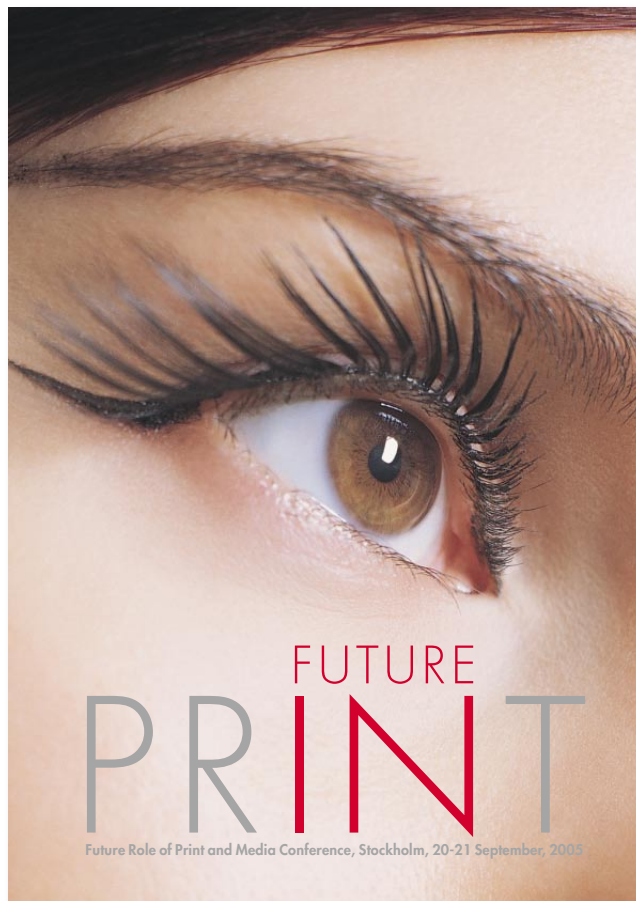
The nature of communication is changing. A decade ago, print was dominant in information and communication. However, media is more diversified now. Print is no longer the obvious first choice when choosing a means for communication.

In the first part of the conference, different aspects of future media developments and the role of print in the media society is looked into. Since print is only one of several options to communicate nowadays, the question arises, "Is it evident that the aim of print is to print information as images and text or are there any other areas where print can be used as a communicator in a wider meaning?"

In order to generate new ideas for the utilisation of print, in the second part of the conference, there will be sessions incorporating presentations and panel discussions. The contributors will be researchers, scientists and businessmen from various fields, e.g. function and materials design, science etc. They are all involved in creating a future framework for new applications of print.

The two day event, including the conference and workshops, will not only provide rich opportunities for the exchange of ideas and thoughts about the future role of print, but it will also provide the option of visiting Grafex 2005, a graphic arts exhibition. ●

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Have you changed address?

Please let us know by sending an e-mail to info@stfi.se.

B



Where has the light gone, Grace?

Ludovic Coppel, Hjalmar Granberg and Marie-Claude Béland are the people behind Grace, an STFI-Packforsk optical modelling tool for simulating where light goes when it hits paper:



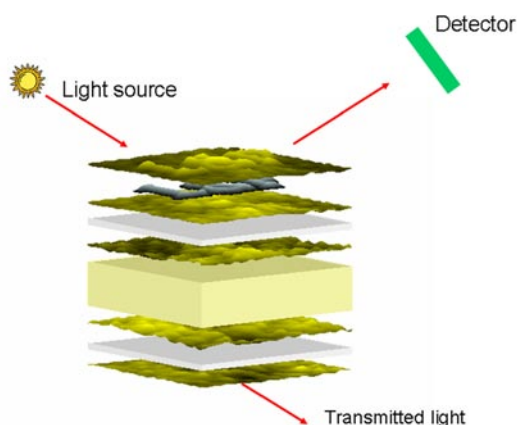
"The user interface assists the user in building up a paper structure and in visualising the simulation results," say Ludovic Coppel and Marie-Claude Béland.

"Grace allows us to show many different effects," says Marie-Claude Béland. "To give some examples, this tool shows how light is reflected, transmitted or absorbed in all the strata of the paper."

Flexible modelling tool

"Since this tool is so flexible and offers so many simulation variations, it can be used to predict paper characteristics before the paper has been made," continues Marie-Claude Béland.

On a paper machine, it is not so easy



Grace simulates a three dimensional structure model of the paper, consisting of different layers with varying optical properties and calliper variations. Incoming light spreads inside the paper and is detected by sensors that simulate a camera, for example.

to control all the parameters and to know exactly how they will influence the properties of a paper. Yet, with the help of a well developed optical modelling tool, it is possible to identify the trends and the characteristics that will have an effect on the finished paper. With Grace, this can be done by artificially building up the paper in a computer model and then, in a controlled mode, altering the various parameters.

Optical interplay between paper and light

The changes made in the model can then be visualised in the programme. It shows the optical interplay between the paper and light in the different strata of the paper.

"We have developed Grace over the course of about 10 years. Improvements have been made to it year after year," says Ludovic Coppel.

There is another interesting application field for Grace. It can be used for analysing printed paper products. It is possible to study the connection between the physical parameters and how one perceives a printed product.

"Now we have even developed a model for how the eye sees the light coming from paper products," adds Marie-Claude Béland.

Grace uses the measured paper prop-

erties to be able to simulate the effect of changes in the paper structure on the appearance of the paper and its optical properties. Some of the properties that have been studied are mottling, gloss and gloss variation, fluorescence as well as colour reproduction. Grace is also capable of generating a paper structure with certain properties that can then be easily visualised. ●

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Grace är ett optiskt modellerings- och simuleringsverktyg som visar var ljuset tar vägen när det träffar pappersytan. Bland annat kan verktyget visa hur ljuset reflekteras, transmitteras och absorberas i papperets alla skikt.

Grace är flexibelt och erbjuder många olika simuleringsvarianter och kan även användas till att förutse ett pappers egenskaper innan det är tillverkat.

I en pappersmaskin är det inte så lätt att kontrollera alla parametrar och exakt veta vilka parametrar som påverkar papperets egenskaper. Men med hjälp av Grace går det att identifiera trender och vilka egenskaper som påverkar det utvecklade papperet. De förändringar som görs i modellen kan programmet visualisera och visa det optiska samspelet mellan papper och ljus i papperets olika skikt.



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