



VTT Technical Research Centre of Finland
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<https://www.vttresearch.com/en>



Source: VTT

VTT Technical Research Centre of Finland Ltd

VTT is a fully state-owned limited liability company operating under the ownership steering of the Ministry of Economic Affairs and Employment.

VTT is one of Europe's leading research and development institutions. In 2020 VTT had a staff of 2,129, net turnover of 149M€, a total of 1,410 customers, and patents or patent applications in 440 patent families. In December 2017, VTT was recognised with the 'HR Excellence in Research' award by the European Commission.

Exponential hope

VTT is impact-driven and takes advantage from its wide multitechnology knowledge. VTT brings together people, business, science and technology to solve the biggest challenges of our time. This is how the organisation creates sustainable growth, jobs and wellbeing and bring exponential hope.

R&D infrastructure

VTT is a research and technology organisation focused on three areas: Carbon neutral solutions, Sustainable products and materials, and Digital technologies. The world-class research environments enable product development from basic research to piloting and even small-scale production.

Guided tour of infrastructures morning of 11 May

Join the VTT team for a unique opportunity to see the foam forming pilot environment, where the staff will be running a nonwoven demonstration.

Additionally, you will have the chance to visit VTT's nonwovens labs and to get to know VTT's biomaterial processing possibilities.

Nonwovens Innovation Academy 2022

11-12 May, Jyväskylä, Finland

Tuesday 10 May 2022

- 13.30 – 14.30 Bus transfer to [Metsä Group](#) Pro Nemus Visitor Centre
- 14.30 – 17.30 Guided tour of Metsä Group Pro Nemus Visitor Centre
- 17.30 – 18.30 Bus transfer back to hotels

Wednesday 11 May 2022

- 8.15 – 9.15 Bus transfer from hotels and Jyväskylä train station to VTT
- 9.30 – 10.30 Presentation on Valmet

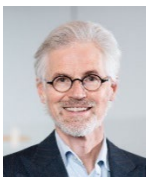
10.30 – 11.15 Coffee break and networking

11.15 – 12.30 Guided tour of VTT

12.30 – 13.00 Bus transfer from VTT to Scandic Laajavuori Hotel (conference hotel)

13.00 – 13.45 Lunch and networking
Announcing posters and tabletops exhibition

13.45 – 13.55 Opening and welcome address



Marines Lagemaat, Scientific and Technical Affairs Director, **EDANA** (Belgium)

13.55 – 14.40 KEYNOTE SPEECH: CELLULOSIC FIBRES AND SUSTAINABILITY



- Emerging cellulose-based fibre types coming on the nonwoven and textile market
- Need to balance the concepts of renewable raw materials and recycling
- Cellulosic fibres show main advantages in sustainability and may initiate new generation of disposables

Prof. Ali Harlin, D.Sc., VTT Technical Research Centre of Finland (Finland)

SESSION 1: MEDICAL AND MODELLING PROJECTS



MODERATOR

Marines Lagemaat, Scientific and Technical Affairs Director, **EDANA** (Belgium)

14.40 – 15.05

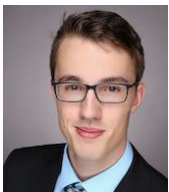


Nonwoven fabrics for non-invasive diagnosis of wound infection

- Experimental development of bicomponent wet-spun fibres engineered to detect specific markers of wound infection
- Analysis of fibre structure-function relationships and quantification of infection response behaviour
- Incorporation as a blend component in drylaid nonwoven wound dressings for rapid and non-invasive wound monitoring

Rebecca Cooper, Postgraduate Researcher, **Clothworkers' Centre for Textile Materials Innovation for Healthcare (CCTMIH) - University of Leeds** (United Kingdom)

15.05 – 15.30



Use-cases for the application of Artificial Intelligence (AI) for nonwovens production with a focus on small and medium enterprises (SME)

- Recent advances in AI and optical measurement technology give enterprises the opportunity to gather a lot of on-line process data
- A new study of acatech shows that many SME still struggle with usage of AI, mainly because lower production output leads to a lower ROI for investments in infrastructure
- An approach for solving the problems is to focus on a single pilot project using AI that has a high ROI and a narrow focus
- Proven Use-Cases for AI in nonwovens production, helping SME to choose the right application for AI and getting the most out of their investments

Ruben Kins, Research Associate, **Institut für Textiltechnik der RWTH Aachen University** (Germany)

15.30 – 15.55



Application of nonwoven fibrous matrices as substrates for thermostabilisation of adenovirus vectored vaccines

- Cost of maintaining cold chain of vaccines and challenges associated with its logistics in low-income countries
- Fundamental approach to thermo-stabilise vaccines using a combination of desiccated sugar solution on a nonwoven structure
- The fibrous matrix needs to be biocompatible and suitable for clinical translation
- Different wet-laid nonwoven matrices investigated and one made from 100% PVA polymer showed encouraging vaccine thermostabilisation performance

Zohreh Robabeh Gharaei, Postdoctoral Research Fellow, **University of Leeds** (United Kingdom)

15.55 – 16.40

Coffee break and networking in the poster & tabletop exhibition area

16.40 – 17.05



Van Wyk's model of the compressibility of nonwoven materials: merits, limits, and misconceptions

- Discussion on van Wyk's classical compression model of fibrous materials
- van Wyk introduced the novel approaches and ideas
- Breakdown of van Wyk's model of compressibility for planar nonwoven materials
- Misconception about the "inverse cube" pressure-volume relationship and modification in van Wyk's model

Dr Amit Rawal, Professor, **Indian Institute of Technology Delhi** (India)

17.05 – 17.30



Prediction of nonwovens filtration performance for submicron aerosol particles using deep neural networks

- Innovative pressure drop and filtration performance prediction of nonwovens based on machine learning methods
- Training of the deep dense network with experimental and numerical data using various nonwovens manufactured for filtration tasks
- Predicted pressure drop and filtration performance for the test filter media used are in line with expectations and the state of knowledge about the function of nonwovens as filters

Maximilian Friedrich Kerner, Scientific Researcher, **Institute of Particle Process Engineering | Technische Universität Kaiserslautern** (Germany)

17.30 – 18.00

Networking in the poster and tabletop exhibition area

18.30 – 19.00

Bus transfer to Savutuvan Apaja

19.00 – 22.00



EDANA Cocktail Party & the NIA Posters Contest Awards Ceremony

The ideal opportunity for relaxed networking.

Dress code: business casual



22.00 – 23.00

Bus transfer to hotels

Thursday 12 May 2022

08.30 – 09.00

Welcome coffee & networking in the foyer area

SESSION 2: CELLULOSIC AND OTHER BIOMATERIALS



MODERATOR

Pirjo Heikkilä, Senior Scientist, VTT Technical Research Centre of Finland (Finland)

09.00 – 09.25



Innovative plastic-free absorbent hygiene products made out of functionalized cellulose-based fibres

- Kelheim Fibres sustainable plant-based and biodegradable cellulosic fibres
- Designed for the use in single-use hygiene products and in reusable applications
- Addressing the key functionalities of absorbent hygiene products.
- Performance of absorbent hygiene products at the same level as when using synthetic fibres
- A significant contribution to a plastic-free future for absorbent hygiene products

Ingo Bernt, Group Leader Fiber & Application Development, **Kelheim Fibres** (Germany)

09.25 – 09.50



Reconquering the synthetic realm with biobased solutions

- Synthetic fibres are more and more replaced in the nonwovens market by more sustainable alternatives
- Some properties from synthetic fibres have therefore to be transferred to more sustainable cellulosic fiber types
- Holistic view of the development of modern cellulosic specialty fibres

Axel Rußler, Project Manager, **Lenzing** (Austria)

09.50 – 10.15



Sustainable innovation: performance enhanced hemp and linen fibres for the global nonwoven industry

- Supply chain oversight: from agronomics to fibre processing, quality control and reporting
- Fibre conversion on nonwoven platforms: efficiency, potentials and metrics
- Environmental sustainability: from field to fabric, third party certifications and life cycle analysis
-

Jason Finnis, Chief Innovation Officer and Executive VP, **Bast Fibre Technologies** (Canada)

10.15 – 10.45

Coffee break and networking

10.45 – 11.10



Botanical fibres to produce carded pulp wipes

- The so-called carded pulp processes offer potential to expand the types of fibers used beyond wood based fibers
- Encouraging results have been obtained with annual local plants
- Economical, technical and functional parameters should be factored in to select the most appropriate alternative fibres for carded pulp wipes

Diane Raverdy-Lambert, Engineered Paper Chief Scientist & Director Regulatory, **SWM** (France)

11.10 – 11.35



Creating sustainable nonwovens with thermally processable polyvinyl alcohol; an environmentally friendly and high-performance polymer

- Aquapak technology allows high hydrolysis PVOH fibres to be processed via melt extrusion, without polymer modification, maintaining full polymer functionality and end of life biodegradation
- PVOH nonwovens can be manufactured in one process step, creating opportunities for single use applications which can generate large quantities of waste
- Aquapak PVOH offers high mechanical strength, liquid management, UV resistance and barrier properties
- The functionality of PVOH allows traditional plastics to be replaced with a polymer that is designed for the circular economy

Jack Eaton, Product Manager Nonwovens, **Aquapak Polymers** (United Kingdom)

11.35 – 12.00



Polyhydroxyalkanoates & future sustainable nonwovens

- Review of the current progress of PHAs in fibre-based applications
- Introducing the benefits, limitations and barriers to entry to nonwoven markets
- Emerging PHA polymer technologies and opportunities for nonwoven products made from PHA polymers will be detailed

Ross Ward, Chief Commercial Officer, **NIRI – Nonwovens Innovation & Research Institute** (United Kingdom)

12.00 – 12.30

Panel discussion between the speakers Cellulosic fibres: game changer or niche?

12.30 – 13.45

Lunch & networking

SESSION 3: MANUFACTURING AND MEASURING TECHNOLOGY



MODERATOR

Diane Raverdy-Lambert, Engineered Paper Chief Scientist & Director Regulatory, **SWM** (France)

13.45 – 14.10



Opportunities of foam forming in web production from recycled textile fibres and on-line binder application for nonwovens

- Wet foam as transfer medium in the production of nonwovens from recycled fibres
- Microfibrillated cellulose as a binder for foam formed viscose nonwoven
- On-line foam assisted application of acrylic dispersion binder in pilot environment

Pirjo Heikkilä, Senior Scientist, **VTT Technical Research Centre of Finland** (Finland)
Taina Kampuri, Senior Scientist, **VTT Technical Research Centre of Finland** (Finland)

14.10 – 14.35



Online-control of the wear level of card clothing used in processing of high-performance fibres

- During processing of high-performance fibres like (recycled) carbon-, glass- and aramide fibres into nonwovens an increased abrasion of the card clothing occurs
- A digital monitoring system for control of the card clothing abrasion has been developed in order to detect the wear level
- The presentation will focus on the development of the image analysis and results obtained on pilot plant research lines as well as three industrial lines used for processing of glass-, aramide- and recycled carbon fibres
- The results will enable a maintenance-optimised process management in terms of 'Industry 4.0'

Holger Fischer, Senior Scientist, **Faserinstitut Bremen** (Germany)

14.35 – 15.00



Presentation of an intermediate technology between meltblown and spunbond processes

- Production of fine fibre webs (meltblow-like) and coarser fibre webs as well with an additional spunbond-like set-up
- All common polymer types processable in a high range of viscosity grade from MFI 40 up to 1200 g/10min
- For PP fibre diameters adjustable from 1 µm to 35 µm in mean without changing the spin-beam set-up
- Compared by 15% reduction in process energy compared to meltblown process

Tim Höhnemann, Scientific Employee, **German Institutes for Textile and Fiber Research – DITF** (Germany)

15.00 – 15.25



New on-line measurement technologies for nonwovens production: challenges and recent developments

- The on-line measurement needs in the nonwoven industry include material identification, product composition measurements and physical characterization needs
- We present some examples about recent research and development results in spectroscopic and imaging on-line measurement methods for the nonwoven industry
- The connection of these results to automation and Industry 4.0 is briefly discussed

Janne Paaso, Principal Scientist, **VTT Technical Research Centre of Finland** (Finland)

15.25 – 15.35



Closing words

Pierre Wiertz, General Manager, **EDANA** (Belgium)

15.35 – 16.15

Farewell drink

16.30

Bus transfer to Jyväskylä train station