

## Portrait – Research at the Fraunhofer IVV

Whether it's packaging, recycling or cleaning with robots: The scientists at the Fraunhofer Forschungsinstitut für Verfahrenstechnik und Verpackung (IVV - Research Institute for Process Engineering and Packaging) continually advance the technical developments for the food industry. Our portrait shows what innovations the researchers have up their sleeves this summer.



Fraunhofer IVV with new director: Prof. Horst-Christian Langowski has gone into retirement and has handed over his position to Prof. Andrea Büttner.  
(Photo: © Fraunhofer IVV)

### Research for recyclable packages and safe processes

As an institute of the Fraunhofer Society, the Fraunhofer IVV belongs to Europe's largest institute for applied research. At the locations in Freising and Dresden in Germany, approximately 300 employees work on new applications in the fields of process engineering and packaging. Their mission: An efficient use of the available raw materials and resources for the benefit of people and the environment. Prof. Andrea Büttner faces the current challenges together with the Institute's management team. "Together with partners from business, science and politics, we're all working full steam on ensuring the sustainable, high-quality supply with food and on developing new packaging concepts", says the new Managing Director.

One goal of the researchers is to orient recyclable packages exactly towards the respective needs of products. They develop product-specific barrier concepts, evaluate the machine runnability of the packaging materials and show how the CreaSolv process developed at the Fraunhofer IVV enables clean separation of plastic composites. For the diverse challenges for all aspects of the packaging law, the scientists offer support along the entire value-added chain. Here the focus is always on the product and process safety.



Pack Peel Scan measures opening forces of peelable packages and supports machine operators with an integrated assistance system. (Photo: © Fraunhofer IVV)

### Sealing seam analysis 4.0

Especially newly developed recyclable materials initially run through a practical test in the area of machine runability and product safety. The operator assistance system integrated in the Pack Peel Scan detects weak points in sealing seams of peelable packages and analyses their causes with artificial intelligence methods. This enables deviations such as folding or contaminations in the sealing seam to be identified, faulty products to be sorted out or process parameters to be specifically readjusted already during the packaging process. The expertise in engineering psychology built up at the Fraunhofer IVV has been integrated in the design of the user interface. With it the gap between integrated data acquisition and a clearly laid out design has been closed.

### Self-learning assistance system for machine operators

The use of bio-based or recycled materials requires a high level of process and empirical knowledge from operators and technicians. To keep valuable experience in the company, the Fraunhofer IVV developed a self-learning system for machine operators with SAM. With algorithms of machine learning and research results from psychology for presentation of information, a system resulted which supports employees with the existing knowledge according to the situation. At the same time, it motivates users to learn, exchange and document their own ideas. Peerox GmbH, a spin-off of the Institute, has brought a software based on the research results onto the market as a modular add-on for new and existing systems. With this product development, system efficiencies are increased, scrap quantities reduced and a contribution to sustainable production is made.



The Mobile Cleaning Device with an automated height adjustment of the cleaning and sensor head for cleaning the exterior of systems and their production environment. (Photo: © Fraunhofer IVV)

## Robots for cleaning systems and production

However, the Fraunhofer team not only offers real-world solutions in the areas of packaging and process engineering. With the Mobile Cleaning Device 4.0 (MCD), the researchers show how cleaning of production rooms can also be carried out with robots. The further development of the mobile cleaning device is equipped with an innovative multi-sensor system. This enables the self-propelled robot to orient itself even under difficult environmental conditions, such as during spray cleaning and in spraying mist. The robot reaches system areas located higher up with an automated height adjustment of the cleaning and sensor head. The control software with a digital twin directs the path planning exactly at the degree of soiling and ensures continuous cleaning documentation. This enables cleaning of hygienically demanding rooms to be carried out automatically and in a reproducible, resource-saving manner for the first time.

## Additional information and contact

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