

# GLOBAL PACKAGING RESEARCH

The international packaging research and education newsletter

## Liquid forming shapes up

Liquid forming systems for rigid polymers appear set to finally gain traction during 2018, with more than one licensee of the LiquiForm technology introducing production-scale equipment.



LiquiForm bottles

LiquiForm uses the pressure of the consumable product (beverage or non-beverage) to form the bottle from a preform, avoiding the need for air blowing to create a much more compact line.

Much of the technology behind liquid forming is controlled by Amcor-owned LiquiForm Group. During 2016, it licensed this know-how to its former partner in LiquiForm Sidel, as well as KHS, Krones and Japan's Yoshino. Confusingly, Amcor is also a licensee.

VP of LiquiForm Ashish Saxena says he expects to see products created with LiquiForm in more than one geographical

market during 2018. First applications are likely in homecare and detergents, he says, but still beverages including water will follow. LiquiForm says it has run successful trials with all the major bottle polymers.

Director of the School of Packaging at Michigan State University (MSU) Susan Selke has been following progress closely. She says: "It's an interesting and novel technology, which may have great promise in certain applications but is obviously limited to particular types of products."

In September 2017, KHS ran its inline demonstration FormFill machine ('powered by LiquiForm') at the drinktec show in Germany, filling still water. KHS says the system could reduce the Total Cost of Ownership of a filling line by up to 30%.

[liquiform-dev.netlify.com/](http://liquiform-dev.netlify.com/)

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## IAPRI Conference and Scholarship

Among many other highlights, the 2018 IAPRI Conference in Zhuhai, China (19-22 June 2018) will host adjudication of the prestigious Student Exchange Scholarship, generously sponsored yet again this year by PepsiCo.

Says Sandeep Kulkarni of PepsiCo Global R&D: "We believe this Scholarship will provide a deserving student with the critical skills and research experience needed for a successful career in packaging." Applications should be submitted by 19 February 2018.

Those wishing to present papers at the Conference are reminded that the deadline for submissions is fast approaching.



More Conference details are available at: [www.2018iapriconference.org/](http://www.2018iapriconference.org/) For more information on the Scholarship, contact Secretary General Ed Church ([sg@iapri.org](mailto:sg@iapri.org)) or visit: [www.iapri.org/about-us/iapri-scholarship/](http://www.iapri.org/about-us/iapri-scholarship/)

## Comment

### A fond farewell

It's hard to believe that this will be my last newsletter for IAPRI, with my handover to Ed Church as Secretary General (SG) nearly complete.

Having worked with no fewer than four IAPRI presidents - Anders Soras, Kees Sonneveld, Thomas Goedecke and now Jay Singh - there is plenty for me to look back on over 16 years.

Anders, who was a fantastic man, full of human as well as scientific insight, welcomed me to IAPRI.

With Kees, we introduced the Working Groups and Corporate Members, helping to map out areas of mutual interest and create stronger links with the world of commercial packaging research. The website and this newsletter also date from Kees's time in office.

Under Thomas, IAPRI brought in the peer review stream for scientific papers at our events and the Student Exchange Scholarship, which has been a great success among young packaging researchers under the generous - and continued - sponsorship of PepsiCo.

I am sure that Jay and Ed will make a great team in taking IAPRI's modernisation process still further. Organisations' priorities may change, but over the years we have grown the number of members, and given that membership a more representative spread geographically. This process will doubtless carry on, and continue to be reflected in the growing strength of (and attendance at) IAPRI events.

I will of course keep in touch with my friends in IAPRI and follow your progress with keen interest.

Best wishes for the festive period and for the future, and many thanks for all your support over the years.

Marie Rushton

## 'A committed and competent SG'

**IAPRI Presidents past and present are among those underlining the huge contribution that outgoing Secretary General (SG) Marie Rushton has made to the organisation over more than a decade and a half of service.**

After accompanying incoming SG Ed Church through a transition period, she will be leaving the role altogether in January.

Former President Thomas Goedecke says: "It was always a pleasure to work with Marie. For the success of an association such as IAPRI, it is essential to have a very committed and competent SG, and Marie more than fulfilled these challenging requirements. She was the stable, consistent factor in the positive development of IAPRI over a number of years, together with four different presidents. Personally, I am very happy to have made a new friend in Marie, and I am sure we shall stay in contact. I wish her every success and happiness in the future."

Current President Jay Singh comments: "We all recognise Marie for her unconditional dedication, grace and congeniality. Marie will be deeply missed, but we can only feel happy for her after many years of service."



Marie Rushton

Board member Renee Wever says: "Besides being meticulous in her role, Marie's personality truly put its mark on our board meetings and IAPRI events. Now that she has stepped down as SG after such a long tenure, we'll have to remind ourselves to 'keep calm and carry on.'"

Ed Church adds: "Marie has given her heart and soul to making IAPRI as great as it can be and wanted everyone's experience with IAPRI to be rewarding and enjoyable."

## News in Brief

- Nominations are open for IAPRI's Lifetime Achievement Award, which will be presented during the IAPRI Conference in Zhuhai, China, in June 2018. Nominations should be sent to Secretary General Ed Church by 1 February 2018. Find out more at: [www.iapri.org/about-us/lifetime-achievement-award/](http://www.iapri.org/about-us/lifetime-achievement-award/)
- Sonoco has announced a five-year, \$2.725M research initiative with Clemson University, building on the partnership behind the university's Sonoco Institute of Packaging Design & Graphics. The Food Research Excellence for Safety and

Health (FRESH) initiative aims to develop new packaging technologies to protect fresh food. \$1.725M will go towards establishing a multi-disciplinary research hub, and the company will also sponsor business-driven research projects to a total of \$1M over the five years.

- EU project IMPACTPapeRec, which has included 19 partners from eight countries - including ITENE, Spain - is holding its final conference on 24 January 2018 at the Committee of the Regions in Brussels. Presentations will include best practice for the collection of paper and board for recycling.

# Michael Sek retires from VU and IAPRI roles

**As some readers will already know, Michael Sek of Victoria University (VU) in Australia has retired from IAPRI duties after over 25 years of attending annual events. He is also retiring from his various roles at the university.**

“The leading academic light for Mechanical Engineering and Distribution Packaging at VU is retiring after over 32 years of outstanding service,” says his colleague Vincent Rouillard. “During that time, he was the acting director of the fledgling Centre for Packaging, Transport and Storage; he was also the Head of the Mechanical Engineering Department, and then Head of the School of Architectural, Civil and Mechanical Engineering and the School of the Built Environment.”

As well as regularly attending IAPRI conferences and symposia since 1992 and serving on the Board since 2010, he was one



*Michael Sek at the IAPRI 2014 Conference*

of the organisers and hosts of the 2014 IAPRI Conference in Melbourne.

IAPRI President Jay Singh says: “Michael’s contributions related to engineering analysis, modelling and simulation of environmental shocks and vibrations, towards modernising the techniques of transport simulation for package performance testing, are globally recognised. His contributions as a researcher and Board Member for IAPRI have been

critical towards its goal to promote and advance packaging research and education for decades. I wish him the very best towards his retirement.”

Incoming Secretary General Ed Church adds: “I’d say that most everyone who has met Michael knows what an extremely nice man he is, and that he is one of the smartest researchers they’ve ever met.”

That flair for research has not been limited to his own projects. “Over the years, Michael has successfully supervised a number of research students, many of whom are now pursuing their own successful careers,” says Rouillard.

## Electronic ballot for IAPRI members

**After many years of only voting in person at annual IAPRI events, members are now going to be given the opportunity to vote electronically on motions put forward by the Board which require membership ratification.**

“Although the General Meetings of members usually have a fairly large turnout, not all members are present,” explains incoming Secretary General Ed Church.

“An important way that members stay engaged is by expressing their opinions through the power of voting. After Board approval, the membership at the last General Meeting went on to approve the proposal to allow electronic balloting.”

As well as encouraging participation, electronic voting will also help speed up the time taken to complete votes on Board actions.

“I’d assume it will be used where there is a sizeable time gap between the Board Meeting and the next General Meeting,” he says.

Members will soon receive further direct communications from the Board on this matter.

## Faculty vacancies at RIT Packaging Science

**Rochester Institute of Technology (RIT) in the US is seeking to fill two tenure-track, full-time assistant professor posts in the Packaging Science department, part of the College of Applied Science and Technology (CAST).**

Candidates will be expected to teach, conduct focused research in packaging science and/or discipline-based education research, and provide service in contributing to the department, college and university. The employment period starts from mid-August 2018.

Minimum requirements include a PhD in packaging science, engineering, materials science or a related field, and a demonstrable knowledge of specific areas of packaging research, such as food or medical packaging, distribution, dynamics or design. Applicants should offer proven research capabilities, including evidence of scholarly activity in relevant areas.

Candidates will be expected to have demonstrated high-quality teaching or training and be able to deliver instruction

across a variety of packaging subject areas.

Teaching responsibilities will include course and laboratory development and delivery using traditional and non-traditional formats. In terms of scholarship, candidates will be expected to help attract external funding and publication in well-defined areas of focus, in accordance with the department’s strategic objectives. A clear professional development agenda is also expected in order to support the department’s growth.

A review of applications began at the beginning of November and will continue until the position is filled. As well as a curriculum vitae and covering letter, candidates are expected to provide a list of references, research statement, statement of teaching philosophy and statement of diversity contribution.

Applications can be made online at <http://careers.rit.edu/faculty>  
Keyword Search: 3431BR  
Alternatively, contact: [careers@rit.edu](mailto:careers@rit.edu)

# Multi-axis testing gets a new spring in its step

**In an industrial setting, single-axis vibration testing for packaging has been the norm for years. As primary, secondary and tertiary packaging materials become less robust, is load stability becoming more of a problem – and is multi-axis testing the answer?**

**Many IAPRI members will recognise multi-axis or multiple-degree-of-freedom (MDOF) vibration testing as a theme behind research papers stretching back over several years. Up to now, this research interest has not fed through into much in the way of system installations or commercial package testing. But that could be about to change.**

It is quite a rare thing for a testing equipment company to have its own third-party labs, where the need is not for proof-of-concept demonstrations to wow potential customers but for data to analyse unpredictable real-world problems. Having in the past spent a decade working in - and managing - Lansmont Corporation's labs, the company's VP for marketing and technology Eric Joneson comes armed with hands-on experience of industry's practical rather than theoretical needs.

He recalls using vertical-only, single degree-of-freedom (SDOF) vibration testing to investigate problems with automotive spare parts which, during the shipping process, "jumped out of their racks." "We could never replicate those scenarios," he says. "And it got to the point where the customer thanked us and took their business elsewhere – to where they had six-degrees-of-freedom (6DOF) systems." At the time, he described a "void" relating to vibration testing data.

Fast forward to 2014 when, before itself being acquired to form part of NVT Group, Lansmont acquired Team Corporation. Team is a specialist in more advanced vibration testing, including multi-axis systems. These new synergies and new investment led to the development of Lansmont's current 6DOF and 3DOF TruMotion systems.

## Installed systems

As reported in the last newsletter, the summer of 2017 saw the installation of Lansmont's first publicly-accessible TruMotion multi-axis vibration test system for commercial packaging applications at fellow IAPRI member Atlantic Packaging. As well as this 3DOF table, Lansmont has installed 6DOF and 3DOF TruMotion systems (one of each) at a major US pharmaceuticals company.



*The Lansmont TruMotion system at Atlantic*

Though originally more familiar with SDOF vibration testing at Clemson University, Kyle Dunno will be responsible for all of Atlantic's transport packaging programmes involving the TruMotion equipment.

Atlantic had always positioned itself as more than a supplier of packaging materials. "But we were missing the validation piece," he says. "Now, we are also able to develop data-driven package solutions."

While 6DOF systems are widely used in, for example, automotive testing, in a packaging setting, systems such as Atlantic's remain extremely rare. In Spain, ITENE has had a smaller 3DOF table in a patent-protected design for several years. The team of engineers behind this and other test equipment has since formed a spinoff company, Safe Load Testing Technologies.

Apart from the system at ITENE, there are two others installed in locations in Europe and Asia. Safe Load CEO Alberto Tellechea says: "We are now in contact with different companies for new installations worldwide."

He has a high opinion of the system's value. "It is very useful both for design and optimising packaging; not only to test and validate a design, but also to get a deeper knowledge of the risks occurring in the supply chain," he says.

So are these systems really needed commercially? And do they offer tangible benefits? Are they more of a fancy toy for researchers than a useful tool for consumer goods manufacturers?

The cost barriers to MDOF testing are well-understood. For those considering bringing the technology in-house, there is a capital cost differential to consider. According to Lansmont, 3DOF equipment might cost around three times as much as a single degree-of-freedom system, while 6DOF could cost four or five times as much. "That's the differential now, but the cost will come down," says Joneson.

### Cost and other obstacles

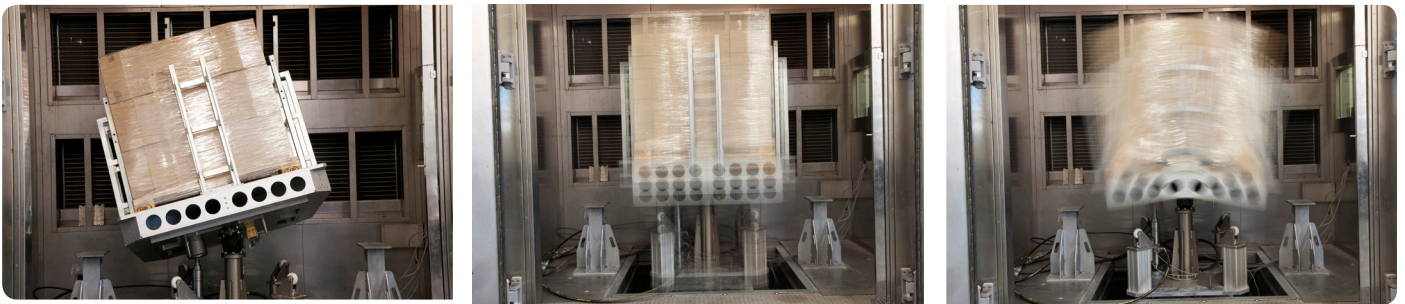
But for customers wanting to analyse their packs or loads, there is a difference in cost, too. In Spain, the Technological Institute of Aragon (ITA) has had a 6DOF system for many years and it has provided some valuable packaging research insights, says the ITA's Carlos Bernad. But the institute provides test services for many different sectors, and automotive and other engineering customers

much of a higher level are you taking the optimisation process?"

At the International Safe Transit Association (ISTA), VP technical Eric Hiser says: "ISTA is certainly interested in leading the way on multi-axis vibration as it pertains to packaging. Early work in this area seems to show that load stability is a major concern, and product-on-product scuffing is a problem which multi-axis can help to understand. I think it will become truly apparent that there are applications which are right for this technology."

He adds: "It takes us one step closer to what's happening in the real world. It's another tool allowing for pack optimisation and for the reduction of both waste and damage."

Multi-axis testing is one of five research areas being sized up by ISTA's Advocate Research and Value Delivery Program. This consortium of interested parties has already requested and is currently reviewing proposals for the first exploratory phase of research.



3DOF testing at ITENE

use the vibration test far more often than the packaging industry. In fact, he says, the 6DOF system might have been used to test packaging just a couple of times over the last six years.

As Bernad explains, the cost of a 6DOF test is higher than for the SDOF alternative. But this is not because the test itself requires more lab time. "Because there are no defined standards or procedures, we have to prepare and develop every test separately," he says.

If cost is one barrier, evidence of benefits is another. Certainly, the simple fact of having a multi-axis system is no guarantee of being able to solve a customer's problems. "The main concerns, when it comes to the application of MDOF technology, seem to be about load stability in the context of cornering, emergency braking, potholes and so on, rather than general vibration testing," says Bernad. "Our system at ITA is really more about vibration. We'd need a system with bigger displacement and longer strokes if we were looking at stability issues."

### Quantifying gains

Then again, questions remain over the incremental benefits, even when the right system is matched with the right test. At research level, claims have been made for years about the benefits of MDOF testing. "But a lack of available systems meant it was hard for anyone to actually validate all of this," says Dunno at Atlantic. "We're proving now that it does make a difference, and there are benefits. But then, the big question is: how much of a benefit is it? To how

"Ultimately, all of the information obtained will become available to ISTA members," says Hiser. "As a standards organisation, we want to standardise both testing and the way people go about collecting, analysing and utilising data."

At Lansmont, Joneson puts the increased awareness about multi-axis testing down to the way that so many types of packaging have been changing. "The emphasis on load stability derives from the use of fewer materials for sustainability reasons," he says. In this context, a gap appears to be growing between standard single-axis test outcomes and real-world performance. "Loads that are passing accepted test practices are experiencing issues in the field."

The large table area on the Lansmont system is significant. "While some systems are designed to handle a single pallet, we realised that being able to accommodate two pallet loads and monitor the interactions between them can be just as important," says Joneson.

What is clear is that the specific benefits of MDOF package testing will soon be much better understood.

[www.atlanticpkg.com/consulting/packaging\\_solution\\_center](http://www.atlanticpkg.com/consulting/packaging_solution_center)  
[ista.org/advocate\\_research\\_value\\_deli.php](http://ista.org/advocate_research_value_deli.php)

[www.itainnova.es](http://www.itainnova.es)  
[www.lansmont.com](http://www.lansmont.com)  
[safeloadtesting.com](http://safeloadtesting.com)

# Packaging Design and Management: the University of Twente, Netherlands

**Anyone who cares about packaging knows that, as a field, it is generally insufficiently represented at the highest levels of business. Any course which promotes a combination of packaging design and management of the design process, then, has to be good news.**

The Packaging Design & Management (PDM) chair at the University of Twente, Enschede, in the Netherlands, sits within the Industrial Design Engineering programme and was originally set up and financed by the NVC Netherlands Packaging Centre in 2006. In particular, it is supported financially by 13 packaging, materials, machinery and consumer product companies from Grolsch to Ardagh, Ball and Smurfit Kappa.

Roland ten Klooster, who runs the PDM courses, says: "The objective is to raise professionalism in the field of packaging design." Another aim, he says, is for packaging to be better-represented in management teams, which is the reason for educating students to master's level.



*Roland ten Klooster*

## 'Companies are asking for new packaging engineers with this level of knowledge'

While students can learn to develop products, basic ways of working, and so on, at bachelor's degree level, ten Klooster only teaches within the master's programme. Here, by combining his two PDM courses with other options, including a thesis, students can spend a year on packaging subjects.

Up to this point, over 80 students have completed a graduation project, he adds, and around 45 of them have found work in the packaging chain, with companies such as Unilever, Danone, Heinz, FrieslandCampina, Amgen and Smurfit Kappa. "Companies are asking for new packaging engineers with this level of knowledge," he reports.

The first PDM course taught at Twente includes background on the functionalities and vulnerabilities of food and non-food products,

packaging materials and production processes. It also covers areas as diverse as logistics, legislation and printing techniques.

"Students have to design a combination of a food and non-food in a single pack, like a bottle of olive oil with a plate, or a package to bake a pie with a tin for baking it, for example," says ten Klooster.

The second PDM option involves working for a company in groups. "I want to bring reality as close as possible to [the students]," he says. "Every year, I try to find a marketer who has a design question. [The students] design the primary, secondary and tertiary packaging, and have to take away as many of the uncertainties as possible, from sustainability, use and costs to the filling process. I guide them through this process and lecture about topics which are required as a part of this." The results are created in 3D drawing programmes such as Solid Works.

When it comes to research, ten Klooster provides some examples: "I have two PhD students working on how decision processes run. One of them has a focus on information, the other on the characteristics of the designer."

The design of packaging lines and equipment also features in the course. "One student has been working on packaging lines with some specific mathematics. The project was for Unilever, and he created a way of thinking based on maths which was so interesting that the report is being kept confidential for 10 years!"

[www.utwente.nl/en/et/dpm/packaging/](http://www.utwente.nl/en/et/dpm/packaging/)

## IAPRI 2019 at Twente

The University of Twente will play host to the 2019 IAPRI Symposium, due to take place on the university campus in the Design Lab (11-14 June 2019). So far, highlights of the preliminary programme include a visit to the Grolsch brewery, possibly together with the social dinner, and a visit to the Virtual Reality Lab. More news will follow.

[www.iapri.org](http://www.iapri.org) International Association of Packaging Research Institutes

IAPRI was established in 1971 as an international membership association to promote packaging research. It is a unique global network which allows organisations to communicate and develop ideas, exchange experiences and in many cases reduce duplication of effort.

For more information please contact: IAPRI Secretary General, Ed Church e: [sg@iapri.org](mailto:sg@iapri.org)

To contribute to the next issue of 'global packaging research', please contact Editor Paul Gander e: [paul@gander123.plus.com](mailto:paul@gander123.plus.com)

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