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PRE

Polymore Research & Education

SMART MATERIALS

BIOPOLYMEREN

UPCYCLING



Stenden Polymore Research & Education Lectorate Sustainable Plastics

Stenden University of Applied Sciences:
International and Nearby!



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As partners, Stenden University, API Institute, and Emmtec Services strive to jointly intensify knowledge, research and network development in the field of sustainable plastics.

The knowledge nexus for sustainable plastics, known as Stenden Polymore Research & Education (Stenden PRE), was established with funding from the province of Drenthe, the municipality of Emmen and *Samenwerkingsverband Noord-Nederland* (SNN). The partners mediate in their knowledge and efforts to consolidate activities and the knowledge infrastructure in the Zuid-Drenthe and surrounding regions. A robust cluster is indispensable if the regions are to be able to effectively face international competition.

The partners will provide the following input:

- Stenden University has an excellently equipped plastics laboratory that is used for education, research and commercial purposes and also has all the necessary know-how and manpower;
- API Institute has laboratory and pilot plant facilities, participates in the lectorates and the active supervision of the students, postdocs and doctoral students;
- Emmtec Services has laboratory facilities, also participates in the lectorates and the active supervision of the students, postdocs and doctoral students.

Objectives

An important objective of Stenden PRE is to consolidate the knowledge chain:

- Collaboration between knowledge institutions, companies, and the public sector in the field of sustainable plastics and plastic technology;

- Consolidating the innovative strength of the plastics sector through applied research;
- Developing and consolidating education in the field of plastics technology through the development of a professional Master's programme (academisation), consolidating the cooperation between Senior Secondary Vocational Education and Higher Professional Education, and consolidating the interaction between education and the business community by means of industrial placements, teaching companies, and courses for professionals;
- Intensifying sustainability and consolidating the cradle-to-cradle concept in engineering education and in the innovation cluster;
- Collaboration with universities.

Organisation

Stenden PRE operates based on the principle of Open Innovation.

This entails the following:

- All research results are made public and are actively distributed throughout the target group;
- Stenden PRE is open to new partners (such as companies, knowledge institutions, intermediaries and government authorities);
- The research programme is not completely fixed. There is room, within the research themes, for projects that have not been formulated in advance;
- Other consortiums can also join.

The Open Innovation concept matches the Stenden PRE objective of consolidating knowledge circulation in the field of sustainable plastics. The knowledge centre focuses on exploratory research with time

horizons of one to three years to commercial application. Another important objective of Stenden PRE is network development.

Stenden PRE research projects could result in concrete market opportunities that could be further elaborated in closed consortiums. On the other hand, consortiums could also pose more general pre-competitive research questions that could be studied and researched in the knowledge centre.

Open Innovation

The iPod, Senseo, Beertender and mountain bikes were established in a process in which companies collaborated with other parties in an open way. The "Open Innovation" trend will grow substantially in the future. The Adviesraad voor het Wetenschaps- en Technologiebeleid (AWT) states in its recommendation memo, "Opening van zaken" (full disclosure), that the existing innovation policy must be broadened to anticipate and exploit this trend. The Open Innovation trend is not a new phenomenon, but it is growing strongly. International competition is putting pressure on companies to set the innovation process up in a more flexible, creative, and efficient way. Internal research, conducted by EIM, has led the Adviesraad voor Wetenschaps- en Technologiebeleid to conclude that nearly half of all Dutch companies have been innovating in a more open way over the past few years. Although Open Innovation has always been more prominent in the SME, it is beginning to grow throughout the business community. (Opening van zaken; beleid voor open innovatie, AWT, 2006.)





Application of natural fibres

A lot of basic research is currently being done into the application of natural fibres. The following are a few examples of natural fibres: grass, flax and hemp. The research is mainly focused on mapping out the properties of the fibres, and their ability to mix with other natural fibres.

The spin-offs to the consortiums include the specific application in textile products. An excellent example of this is nettle fibres: Certain types of nettle fibres are currently being cultivated for textile applications. Clothing manufactured with nettle fibre is already commercially available in the market (Brennels Mode in Arnhem).

New consortiums could be formed around the applications of other natural fibres in technical yarns and in composites.

Education & Research

THEME 1: UPCYCLING

'Upcycling' refers to the upgrading of the quality of plastic. This could be done by removing plastic components from written-off products and re-using it, or by processing plastic waste into high-quality raw material. Plastic upcycling is a broad theme that comprises a number of different issues: Technological issues include making polymers 'upcycle-proof' in the material science sense, and making it possible, in the logistics, engineering and process-technology sense, to effectively convert plastic waste products into high-quality raw materials.

THEME 2: BIOPOLYMERS

The concept, biopolymers, has two meanings that often go hand in hand in the practice. Polymers from biological origins are often referred to as biopolymers, but the term also refers to polymers that are biodegradable. A good example of the former is the use of potato starch as a packaging material,

while an example of the latter would be the possibility of producing biodegradable fishing nets that would contribute to the reduction of the amount of plastic waste in the sea.

THEME 3: SMART MATERIALS

This theme covers research into and the development of smart materials, which are to be understood as combinations of sustainable plastics with other technologies, such as sensor applications in protective clothing or other types of applications in the automotive industry.

Stenden PRE makes use of the input of the lecturers and students of the Media Entertainment Management and Technology School, and the participation of companies in the knowledge centre. The latter companies are those with a focus on research and innovation in the field of sustainable plastics technology.

The following companies currently wish to cooperate as partners: Teijn Aramid, Cumapol, DSM EP, Morssinkhof Plastics, Colbond and AKG.

The Media Entertainment Management and Technology School consists of the following programmes:

Mechanical Engineering, Life Science, Information Technology, and Media & Entertainment Management. It is mainly the students and lecturers of the Mechanical Engineering and Life Science programmes that collaborate in Stenden PRE.

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