

# Enabling hands-on learning and polymer research at Fontys

Fontys is an institute with a proactive approach to education. Its polymer studies wing needed a simple, small-scale setup to provide students with **hands-on training in material extrusion and recycling**, without running up unnecessary costs, or wasting time and resources in the process.



## Client

Fontys University of Applied Sciences

## Industry

Education



**“Our Bachelor of Science students are trained to be able to work in chemical, biological and technological laboratories around the world. We try to incorporate upcoming technologies such as 3D printing in our curriculum, studying it theoretically, and researching its applications. Our students use the NEXT to experiment with filament making, exploring its applications in 3D printing and elsewhere.”**

– Guido Smets, Polymer Researcher/Professor at Fontys

## Challenges

Students needed hands-on training in material development. Industrial machinery was complex, offered no flexibility, and led to longer training times and higher training costs.

## Solutions

The NEXT offered Fontys the flexibility to work with small batches of numerous polymers and give students practical training in material extrusion without depending on large-scale extrusion equipment.

## Impacts

- Ability to study recyclability with small batches of material.
- Flexibility to research a wide variety of polymer composites.
- Lower training time and costs; reduced material wastage.
- Effective, hands-on training with a simple, in-house setup.

## Meet Fontys

Fontys University of Applied Sciences ranks among the most prominent educational institutes in the Netherlands. It has campuses in multiple cities, and over 44,000 students enrolled in its bachelors' and masters' programs. These programs cover fields including engineering, technology, economics, business administration, social sciences, and healthcare, among others. Through its future-oriented programs, Fontys aims to contribute to the development of a sustainable society.

The Natural Science wing of Fontys, located in Eindhoven, is one of the only institutes in the world that offer bachelor's courses in polymer studies. The department collaborates with international companies and universities, to develop sustainable solutions in response to the changing needs of the additive manufacturing industry. 3D printing is part of their research facility and assists students in researching and enhancing existing polymers.

The NEXT extruder has been a part of the institute's Eindhoven campus since December 2016, and helps students explore new possibilities in polymer development. It gives students a first-hand introduction to material making and is a more effective educational tool than complex industrial machinery involved in large-scale manufacturing.

## The Challenge:

### Finding an inexpensive and effective research tool for polymer studies

The polymer studies wing at Fontys needed an accessible, user-friendly device that could thoroughly train students in material development and extrusion. Large-scale extrusion machinery could not provide flexibility and hands-on training, thus resulting in a steep learning curve for both the students and the faculty. By extension, relying on industrial equipment also led to a drain on the institute's time and resources.

## The Solution:

### A small-scale, in-house extruder

The faculty at Fontys noticed the NEXT at the 2016 edition of Kunststoffen EXPO. As a machine that could extrude small batches of filament, it offered the ability to work with multiple polymers, and the ability to serve as an effective educational tool for the students. It could assist in research, without leading to wastage of time or material. Adding a NEXT filament maker to the Fontys lab would also be cheaper than depending on industrial extrusion equipment.

## The Impact:

### Multiple polymer composites developed, in quick time and at reduced cost

The NEXT has been a core component of the polymer research facility at Fontys since December 2016. Students have used it to study the properties and recyclability of PLA and PET. They have also used it to extrude materials for 3D printing nano tubes and will deploy it in their efforts to develop sustainable polymer-cellulose composites in the near future. The small-scale processing ability of the NEXT lets them work with small quantities of material at a time, thus reducing costs and wastage. The small-scale setup is also easier to understand and work with than complex extrusion machinery and speeds up research by letting students fine-tune settings and get quick results.



Researchers and students at Fontys hope to use the NEXT to develop sustainable polymer-cellulose composites in the near future.



Guido Smets, Polymer Researcher/ Professor at Fontys, uses the NEXT to demonstrate polymer extrusion to students.



The NEXT being used to make small batches of material, as part of the polymer research projects by Fontys students.

## About **3devo**

3devo is a Netherlands-based tech company on a mission to empower innovators and creators with accessible, high-quality products. Its revolutionary products include the NEXT, a desktop filament maker that extrudes custom 3D print materials, and SHR3D IT, an innovative plastic processor that recycles old plastics into high quality printing granulate. Originating in 2012 as a startup founded by young engineers, 3devo has gone on to acquire an extensive customer base throughout Europe.

Discover more at: <https://3devo.com>  
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