

# Healthcare Gateway

## Reducing the risk of exploring new technologies

### Partners

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**Professor Ric van Noort,**  
Professor of Dental Materials Science,  
School of Clinical Dentistry,  
University of Sheffield

**Fripp Design and Research**  
Tom Fripp, Managing Director  
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### Overview

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A new approach to the manufacture of soft tissue prostheses is the result of a collaboration between material scientists and clinicians at the University and Sheffield-based industrial design company, Fripp Design and Research. Using additive manufacturing technologies, personalised prosthetic ears and noses can be made more easily, for people anywhere in the world. The prostheses are strong, flexible and designed to match the colour and texture of the patient's skin. Professor Ric van Noort, a materials scientist in the School of Clinical Dentistry, was keen to investigate the possibilities offered by additive manufacturing technologies. A chance meeting with Tom Fripp, whose company had the technical capability, began a productive partnership that attracted funding from several sources, including a Translation Award from the Wellcome Trust.

### The challenge

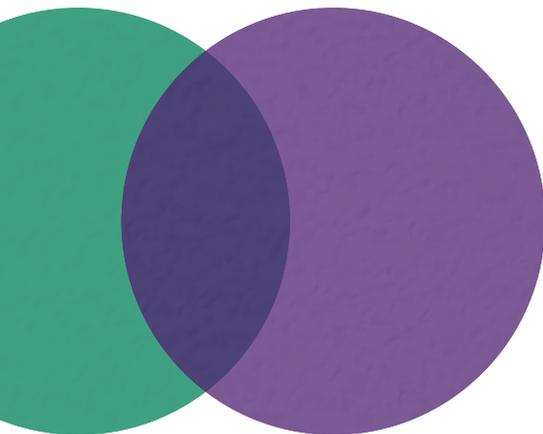
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Traditionally, creating a prosthesis is uncomfortable and time-consuming for the patient, involving intrusive and labour-intensive techniques. It is generally only people in countries with dedicated oral maxillofacial centres staffed with highly skilled technicians who benefit from advanced soft tissue prostheses.

### Contact the Healthcare Gateway

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## What happened

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Fripp Design and Research developed computer aided design software that uses images of the patient to tailor the prosthesis design. A sophisticated 3D printer then produces it by building up layers of a material that has the right texture, colour and biocompatibility. The first prototype was a replacement nose for a nasal cancer patient. "She was delighted. In the past she'd had to undergo an invasive process that could take all morning. We told her that all she would need to do was sit down and have her picture taken," says van Noort.

Because they contain a smaller proportion of silicone, the prostheses made by additive manufacturing are much lighter. For the patient, this means a more comfortable, natural and wearable nose.

## Next steps

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The technology can store a product profile for each patient, so replacements are very easy to make. This improves long-term care and makes prostheses more widely available. "All we need is the 3D and 2D colour data to print out a new nose or ear here in the UK and then we can courier it to the patient who might be anywhere in the world," explains van Noort.

Fripp Design and Technology is already seeing commercial benefits from the work. "Developing high-tech products with the backing of a well-known partner such as the University right here on our door step is an invaluable resource" says Tom Fripp. The team are planning clinical trials that aim to make the technology available to the thousands of people around the world who still lack access to any kind of soft tissue prosthesis.

## Benefits

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Professor van Noort is clear that working with industry was crucial for the project: "From the start we approached this problem from a multidisciplinary perspective. There was a strong spirit of collaboration bringing together the knowledge and experience of clinicians, technicians, people like myself with material science backgrounds, and the design team at Fripp Design and Research. We couldn't have done it any other way."

See how Fripp Design and Research benefitted from the collaboration at <http://www.youtube.com/researchatsheffield>

