

# 3D Printed Sensing Stents

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## Technology description

Stents are continually evolving, especially with the development of newer and better materials and increasingly complex shapes and capabilities. However, despite all their advancements, stents are still at risk for complications such as blood vessel damage during implantation, and thrombosis, restenosis, clots, scarring, etc., after implantation. Stents having the ability to continuously monitor vessel environments would enable a practitioner to prevent or quickly treat those potential complications. Researchers at Arizona State University have developed a novel 3D printed stent that is able to monitor the environment into which it has been implanted. These stents are made of specific biocompatible materials which can measure deformation and act as a strain gauge. The stent can take measurements during implantation as well as after surgery to monitor for growth or changes in aneurysms or blood vessel compliance. Measurement data can be wirelessly transmitted to a receiver outside the body. This technology effectively and efficiently enables the development of a new generation of smart stents which could very well reduce complications related to surgical stent procedures while using simple and cost effective materials.

## Application area

3D printed stents with deformation/strain sensing capabilities for measuring physiological changes in the environment indicative of :

Restenosis

Stent thrombosis

Aneurysm

Insertion site damage

## Advantages

3D printing allows for custom producing stents for specific sites in the body and/or for specific needs of a patient

Simple and cost effective materials

Can be used to monitor the performance of the stent

Reduces the need for costly and time consuming procedures to test the integrity of the implanted stent/vessel wall

Quickly identifies problems in stent performance  
Non-bulky transmitter and power source

## Institution

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