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Microsensors for instrumented medical tools for their real time monitoring

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In the field of interventional radiology, when a physician wants to make a puncture or a biopsy for example, he must insert a long medical needle in the human body. This instrument can be deformed by its environment (because of the inhomogeneity of the human tissues) and miss its target. The consequences can be dramatic. Traditionally, the physician use medical imaging to help him to reach its target. But no medical imaging gives satisfactory results for different reasons. Another possibility is to use the modeling. But all modeling methods use assumption that the needle and/or the human tissues are crushproof. And it is well known that this assumption is not realistic. So in our work, we propose to instrument a needle with microgauges. These microsensors allow to measure in real time, during its use, the strain of the needle. We can calculate from this strain the real shape of the needle and give it to the physician, in a previous medical image of the patient. The novelty in this work is that the microfabrications are processed on an unconventional substrate (curved surface and stainless steel). The perspective of this work is to broaden the applications to other medical tools.

Biography

Agnès Bonvilain received an MS degree in Electrical Engineering in 1986, a PhD degree in Automation and Computer Science in 2002 and a HDR in October 2012. In 2005, she joined the University of Grenoble, France as an Assistant Professor in Electrical Engineering. Her research activities are related to the integrated BioMEMS.

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