The Mach Zehnder Interferometer biosensor for single nucleotide DNA testing with two mismatches bases in the BRCA-1 gene

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In order to solve the drawbacks of sensitivity and portability in optical biosensors we have developed ultrasensitive and miniaturized photonic silicon sensors able to be integrated in a “lab-on-a-chip” microsystem platform. The sensors are integrated Mach-Zehnder interferometers based on TIR optical waveguides (Si/SiO2/Si3N4) of micro/nanodimensions. We have applied this biosensor for DNA testing and for detection of single nucleotide polymorphisms at BRCA-1 gene, involved in breast cancer development, without target labeling. The hybridization of different concentrations of DNA target with two mismatching bases corresponding to a mutation of the BRCA-1 gene was detected with this biosensor. A limit of detection of 25 nM was achieved.

Biography
José Sánchez del Río Sáez is a postdoctoral researcher in Alter Technology. He was a postdoc in the Face Recognition and Artificial Vision (FRAV) group of the Statistical and Informatics department at Rey Juan Carlos University (URJC). He has worked in CSIC for 5 years in the IEM-CSIC analyzing big data collected from physics experiments at big facilities. He has written 4 patents as a patent researcher in Biometrics in an international IT company. He did his PhD in Biotechnology in the Biosensor group in Madrid at IMM-CNM-CSIC.