Abstract: Molecularly imprinted polymers (MIPs) are artificial biomimetic materials attracting increasing attention due to ease of synthesis combined with strength, robustness and molecular recognition capabilities on a pair with those of biological elements (e.g. antibodies and enzymes) [1]. As “antibody mimics”, MIPs are used in a multitude of fields, and the number of applications is constantly increasing due to the improvement and development of new synthetic approaches. In this context, photostructuring of MIPs is particularly attractive because of the possibility of tightly controlling their features in terms of size, morphology and thickness. Here, we propose to take advantage of photo-controlled radical polymerisation, for the deposition of MIPs on nanostructured porous silicon (pSi), with high aspect ratio (100) and columnar pores with size around 50 nm, used as interferometer. PSi has been increasingly exploited in bio/chemosensing due to its huge specific surface, straightforward fabrication and low cost, which allows mass production of cheap biosensors for point-of-care application to be envisioned. In the present work MIPs against propranolol as model target were synthesized within nanoporous silicon under visible light. A homogeneous thin layer deposition was achieved on pSi, as evidenced by UV-Vis reflectance spectroscopy. The resulting sensor was challenged toward propranolol detection and preliminary results indicated good linearity in the concentration range from 5 to 100 µM with a LOD of 3 µM. Propranolol detection tests performed in tap water confirm the ability of the sensor to detect the target in real matrices. Moreover, detection tests using metoprolol, atenolol and timolol (other b-blockers) as interfering molecules demonstrate a good selectivity of the developed sensor.