

# Biodegradable micro-needle for transdermal drug delivery and the 3D printing method to realize the device

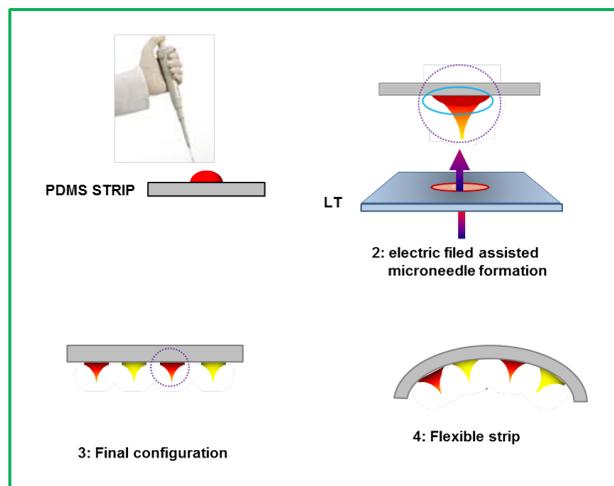


Figure 1: Fabrication proces



Figure 2: Homemade microneedles patches for customized therapies

## Publication related to this invention

- S. Coppola, R. Vecchione, E. Esposito, C. Casale, V. Vespini, S. Grilli, P. Ferraro, P. Netti, "Electro-drawn drug-loaded biodegradable polymer microneedles as a viable route to hypodermic injection" *Advanced Functional Materials* 24, 3515-3523 (2014).
- P. Ferraro, S. Coppola, S. Grilli, M. Paturzo, V. Vespini, "Dispensing nano-pico droplets and liquid patterning by pyroelectrodynamics shooting". *Nature nanotechnology* 5, 429-435 (2010)
- S. Grilli, S. Coppola, V. Vespini, F. Merola, A. Finizio, P. Ferraro "3D lithography by rapid curing of the liquid instabilities at nanoscale" *PNAS* 37, 15106-15111 (2011)

## **ISASI @ CNR**

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Description	<p>The National Research Council (CNR) is the major public research institution in Italy with multidisciplinary research activities. The mission of the CNR is to perform research in its own Institutes, promote innovation and competitiveness of the national industrial system and to endorse the internationalization of the national research system, to provide technologies and solutions to emerging public and private needs and to contribute to the qualification of human resources.</p> <p>The Institute of Applied Sciences and Intelligent Systems (ISASI) belongs to the Department of Physics Science and technology of Matter (DSFTM). The main Unit is located in Naples. The current staff of ISASI has a total of 42 Researchers, 31 among PostDoc Research Fellows, PhD students and collaborators. Moreover about 23 Associate Researchers contribute to ISASI research activities from various Universities and research centres. ISASI has: 10 optical labs with 15 fully mounted optical benches; a clean-room for nanolithography; 2 microscopy labs.</p>
About	<p>The ISASI team, has developed recently a nanoprinting technique based on the pyroelectric effect with two unique properties in the field of EHD approaches: 1) free from external circuits; 2) free from nozzles. In fact, the EHD force able to manipulate polymers is generated by the spontaneous high electric potentials (in the range of kilovolts) originated onto the surface of pyroelectric crystals (i.e. lithium niobate, lithium tantalate).</p>