

PRESS RELEASE

November 16, 2017

Towards an integrated Point-of-Care diagnostic device



October 6, 2017, David Gosselin defended his doctoral thesis at University Grenoble Alpes prepared under the supervision of the Professors Didier Chaussy and Naceur Belgacem (Grenoble INP-Pagora / LGP2) and the co-supervision of Jean Berthier, Research Engineer (CEA, Grenoble). He presented the results of his research work entitled ***Towards an integrated Point-of-Care diagnostic device: use of capillarity as well as thermoforming and screen printing processes.***

Developments of microfluidics (the study of flows at the sub-millimetric dimensions) have made possible the integration of most of the macroscopic functions of laboratory fluidic systems in a miniaturized system, thus realizing a lab on a chip. This allows the conception of low cost, sensitive and efficient medical diagnostic device usable outside of a medical infrastructure. Such devices are called Point-of-Care systems. The design and fabrication of such devices requires an elaborated and coherent integration that takes into account all the constraints imposed by the targeted final application.

The work reported here, and performed during the PhD internship, is focused on the study of the concept and development of the integration of a PoC device based on the isothermal LAMP (Loop mediated AMPlification) reaction for the molecular analysis of DNA. In order to offer a cheap and easily industrialized system, we investigate the use of paper as the chip material and thermoforming as the mean to build the channels. These two techniques are currently used in the industry and their adaptation to the fabrication of such devices is easy and low-cost.

In order to perform a LAMP reaction, specific functions such as a heating and a detection system are required. The integration of these functions was carried out using screen printing

The Laboratory of Pulp and Paper Science and Graphic Arts (LGP2) is a joint research unit (UMR 5518) run by the CNRS, Grenoble INP and the Agefpi. It is home to three teams: Biorefinery: chemistry and eco-processes – Multiscale biobased materials – Surface functionalization through printing processes. The research conducted by LGP2 strives to meet society's expectations when it comes to sustainable development (green chemistry, clean processes, recycling, biobased materials, renewable energy) and traceability & safety (functional materials, smart paper and packaging). <http://pagora.grenoble-inp.fr/research/>

Grenoble INP-Pagora, the international school of paper, print media and biomaterials is one of six engineering schools of Grenoble Institute of Technology (Grenoble INP). The school is Quality, Safety & Environment certified and committed to sustainable development. It trains socially-responsible engineers for the sectors of green chemistry, paper, printing, packaging, biomaterials and printed electronics. It also offers two vocational degrees (*Digital workflows, publishing & print production* and *European industrial printed communication engineering*). Its wide range of courses and pedagogical expertise – at engineering and vocational degree levels – allow it to constantly tailor its training to industry's needs. Strong partnerships with companies allow the 60 graduates it produces each year to embark upon stimulating careers in France and abroad. The school also provides international training in conjunction with several European universities, as well as offering a course in English: the Post Master *Biorefinery: bioenergy, bioproducts & biomaterials*. The innovative research performed by its LGP2 laboratory helps to improve processes and create products that meet all the latest requirements, notably those linked to the environment. The Cerig's role is to keep an active eye on technological developments in these industries. These various activities ensure that the training offered is up to date with the latest scientific and technological advances. <http://pagora.grenoble-inp.fr> – <http://cerig.pagora.grenoble-inp.fr> – <http://www.facebook.com/GrenobleINP.Pagora>



Press and Public Relations: Jocelyne Rouis

Tel + 33 (0)4 76 82 69 44 - Fax: +33 (0)4 76 82 69 33
presse.pagora@grenoble-inp.fr

View all our press releases at
<http://pagora.grenoble-inp.fr/press/>

Drafted by: A.Pandolfi / Sent by: N.Vieira

technology. Heating is done by Joule effect using a layer of carbon-based conductive ink. Detection is performed by a potentiometric method, using polyaniline-covered electrodes. It is shown that this approach is compatible with integration when the screen-printing layers are superposed. Besides they can be printed before thermoforming, resulting in a highly integrated system.

Contacts:

Didier.Chaussy@pagora.grenoble-inp.fr

Naceur.Belgacem@pagora.grenoble-inp.fr

Logo : logo-lgp2.eps

The Laboratory of Pulp and Paper Science and Graphic Arts (LGP2) is a joint research unit (UMR 5518) run by the CNRS, Grenoble INP and the Agefpi. It is home to three teams: Biorefinery: chemistry and eco-processes – Multiscale biobased materials – Surface functionalization through printing processes. The research conducted by LGP2 strives to meet society's expectations when it comes to sustainable development (green chemistry, clean processes, recycling, biobased materials, renewable energy) and traceability & safety (functional materials, smart paper and packaging). <http://pagora.grenoble-inp.fr/research/>

Grenoble INP-Pagora, the international school of paper, print media and biomaterials is one of six engineering schools of Grenoble Institute of Technology (Grenoble INP). The school is Quality, Safety & Environment certified and committed to sustainable development. It trains socially-responsible engineers for the sectors of green chemistry, paper, printing, packaging, biomaterials and printed electronics. It also offers two vocational degrees (*Digital workflows, publishing & print production* and *European industrial printed communication engineering*). Its wide range of courses and pedagogical expertise – at engineering and vocational degree levels – allow it to constantly tailor its training to industry's needs. Strong partnerships with companies allow the 60 graduates it produces each year to embark upon stimulating careers in France and abroad. The school also provides international training in conjunction with several European universities, as well as offering a course in English: the Post Master *Biorefinery: bioenergy, bioproducts & biomaterials*. The innovative research performed by its LGP2 laboratory helps to improve processes and create products that meet all the latest requirements, notably those linked to the environment. The Cerig's role is to keep an active eye on technological developments in these industries. These various activities ensure that the training offered is up to date with the latest scientific and technological advances. <http://pagora.grenoble-inp.fr> – <http://cerig.pagora.grenoble-inp.fr> – <http://www.facebook.com/GrenobleINP.Pagora>