



# INN PAPER

3<sup>th</sup> Newsletter



# INNpaper newsletter

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# 01 Foreword



The INNAPER project has just completed its third year. 2020 has been atypical due to the **COVID pandemic**, which has altered our lives and also the normal progress of the project's activities. The lockdown and temporary closure of laboratories at most of our partners' research centres has stopped many experimental tasks and generated a **delay in the fulfilment of the objectives planned** for this period. The biggest bottleneck has been the delay in the manufacture of the so-called **common electronic platform**, since it was planned to be carried out precisely during the lockdown months. This has had a direct impact on the development of the **three use cases** of the project (Smart labels, PoC immunosensors and PoC genosensors), since these are built on the common platform.

The good news is that **the first common platform prototypes**, containing printed and interconnected devices (specifically battery, display and NFC system) on a paper sheet **are now available** and their functionality has already been demonstrated. In addition, the manufacture of smart label prototypes has already started, and the first results being successful. On the other hand, it is worth mentioning that after the launch of the **INNAPER open call**, the proposals received are already in the **evaluation phase**: a new use case will be selected and will contribute to further demonstrate the utility and the potential of the solutions proposed and developed in INNAPER. For all these reasons, we are looking forward to 2021 with optimism and enthusiasm, hoping to achieve all our goals.

**Ana Viñuales**

Project Coordinator



# 02 INN PAPER results



Although **COVID-19** has affected our work, we still managed to get results! This year **three scientific articles** have been published and some more are on their way.

Developing a **multifunctional tailor-made paper** is one of the main parts of the INN PAPER project. This year, our partners at VTT Technical Research Centre of Finland developed **a new printing method** to reach that goal. It consists in a **Vapour-assisted roll-to-roll nanoimprinting lithography**. The resulting films show diffraction effect, that could be useful for different technologies. Read the [paper](#) to know all the details!

This team also published how to use the same method to tackle the challenge of producing **multifunctional bio-based materials**. The findings are a **big step to sustainable paper-based solutions** such as our use-cases of smart labels, drug detectors and diagnostic tests.

Progress has also been made regarding the development of **paper-based batteries**. Our partners at CIDETEC used **cellulose-based hydrogels** as aqueous electrolytes for these devices. Read the [publication](#) to know more!

Also, **three paper prototype samples** for the common platform have been finished by our partners from CEA and characterized and tested by the team from Aix Marseille University. One more step towards the final electronic devices!





# 03 Communication and dissemination

## International Contest Looking for Innovators Using Paper-based Electronics

The contest is open until June 1, 2020.



Printed Electronics Now staff • 05/2020

## International Contest for Innovators Using Paper-Based Electronics



Printed batteries, displays, temperature, humidity and genetic sensors... Over the last two years, the European project INN PAPER has been

During this year, we have been busy working on some **promotional materials** for the technology and we are looking forward to sharing them with you when they are ready for launch in 2021! Also, our **Twitter community** continues to grow and now we are **more than 4.300 people** from across industry and academia, all keeping an eye on paper-based electronics.

Our Open Call for ideas to make use of paper-based electronics appeared in **international press** ([Printed Electronics Now](#), [Printed Electronics World](#)). Our project also was featured in the Organic and Printed Electronics journal, where the partners from CIDETEC presented the cellulose-based hydrogel electrolytes for printed displays. You can check out all of our media appearances in our [website](#).

Sadly, the COVID-19 outbreak caused a lot of cancelations regarding outreach events and trade fairs, but **we are looking forward to attending next year!** In the meantime, our partners participated in online workshops to show the progress in their technologies.

The team from Ynvisible hosted the **webinar** “Making Things Alive with Printed Electronics”, where the speakers talked about the advances in designing and producing with printed electrochromics. You can watch the entire event [here](#).





# 04 Open Call



In the INNPAPER project, we will present three use-cases, but we wanted to go further. That is why this year we launched an [Open Call](#) to **gather new ideas** within printed electronics that could benefit from our technology. The most promising proposal **will gain privileged access to our pilot-line**, whether it is under reduced rates or through a collaborative project

Due to the pandemic, the application period was extended until the 31st of August, and we received some really interesting submissions! Right now, the proposals are being evaluated: **the winner will be chosen at the end of December and announced in the New Year.**



# 05 The latest trends in printed electronics

Every month, we gather the latest and most relevant news on printed and flexible electronics in our [website](#). Among the most interesting ones of 2020, we have selected:

## [Paper-based diagnostic tests for COVID-19](#)

Lateral flow technology is widely used in biomedicine, such as in pregnancy tests. Using a paper substrate, these devices detect the presence of a target substance in a sample that can be urine, mucus or blood. In the current pandemic, a group of researchers from the Massachusetts Institute of Technology (MIT) adapted **paper-assays to detect antigens and antibodies for the new coronavirus and serve as [diagnostic tests](#)** where the PCR method is not available. As we know in INNAPER, using paper makes the devices cheaper and easy to be manufactured in large quantities!

## [Sensors printed directly on human skin](#)

Wearable sensors are taking the world by storm! Now, a team from Penn State University in Pennsylvania has gone one step further and they are **printing sensors** directly onto the skin! They used a layer made of **polyvinyl alcohol** – the main ingredient in peelable face mask – and calcium carbonate from eggshells. The process can be carried out at room temperature, it is **completely recyclable**, and its removal **does not damage the skin**.

## [Turning a sheet of paper into a keyboard](#)

A keyboard is usually made of plastics and metals. But what if it could be made of paper to reduce electronic waste? That is what a team from the Purdue University in the United States have created: a working **keypad** and controller **printed directly onto a sheet of paper**. They were able to use that piece to type letters onto a screen and swipe a finger across a printed volume control. What's more, the device they have created is **self-powered**, as it generates electricity from contact with the finger of the person operating it.

## [3D-printed, wireless sensors made of cellulose](#)

At INNAPER we know that paper is rising as a good alternative to traditional materials for electronics, because it's cheap, flexible, renewable and recyclable, and we aren't the only ones. A joint research team from Canada and Zurich has developed a **3D-sensor system printed on cellulose** that is disposable, ion-selective and has **wireless access**. This means that it can be read from anywhere!





# 06 What's next?



Working in the same room before Covid-19 hit!

The coronavirus pandemic has turned the world upside down and has caused delays in our work. Nevertheless, we have been granted a **four-month extension** by the European Commission. Now our project will finish in **October 2021**, so you will hear from us for a little while longer.

Next year we will be finishing the proofs of concept of our **common platform** and the development and characterization of our three **use-case devices**. We will also reveal more promotional material for our technologies. Stay tuned to our social media to learn more!





# 07 Contact



If you want more information about the project don't hesitate to contact us!

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