



## Industry Interaction Case Study

# haRFest

### Advancing the state-of-the-art through collaborations

The EPSRC Centre exists to encourage and support constructive collaborations, because projects that can harness the expertise and shared interests of multiple parties are able to unlock great innovative power. Recently the Centre collaborated in such a project, where an excellent and productive relationship between all partners enabled the successful creation of a novel printed energy-harvesting device.

The Centre has been involved in an 18-month Innovate UK funded collaborative project – haRFest - alongside the Centre for Process Innovation (CPI) and PragmatIC Ltd, to advance the state-of-the-art by using printed electronics manufacturing techniques to develop battery-free, radio-frequency (RF) energy harvesting modules with a thin and flexible form-factor.

The resulting harvesting device houses a printed antenna alongside printed passive and active components, including an array of tuning capacitors. The device can

be tuned to resonant frequency in order to maximise harvested power output. Without the harvesting device it would not be possible to incorporate printed electronic capability into thin substrates such as packaging due to the requirement for power from thicker and less flexible batteries. This next generation of printed electronic functionality enables product designers to embed electronics into their designs, creating innovative components that are low cost, smarter, lightweight and wireless.

Flexible energy harvesting devices such as this have a key role to play in smart packaging for high value industries such as pharmaceuticals, enabling manufacturers to improve supply chain monitoring, prevent counterfeiting, and provide customers with usage instructions, quality assurance and shelf life assessment. Potential applications for encouraging brand loyalty are also numerous, from incorporating moving or flashing images into interactive point-of-sale advertising and smart packaging, to facilitating the collection of loyalty points.

“HaRFest addressed a wide range of potentially high volume applications identified by PragmatIC’s customers, and we look forward to progressing commercial discussions based on the project’s achievements.”

**Dr Richard Price, Chief Technology Officer, PragmatIC**

