

New research could help make 'roll-up' digital screens a reality for all

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A study, published today in Nature's *Scientific Reports* identifies a new technology which could see flexible electronics such as roll-up tablet computers, widely available in the near future. So far, this area of electronic design has been hampered by unreliability and complexity of production.

Researchers from the University of Surrey worked together with scientists from Philips to further develop the 'Source-Gated-Transistor' (SGT) - a simple circuit component invented jointly by the teams.

Previously, they found that the component could be applied to many electronic designs of an analog nature, such as display screens. Through this current study, researchers have now shown that SGTs can also be applied to next-generation digital circuits.

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SGTs control the electric current as it enters a semiconductor, which decreases the odds of circuit malfunction, improves energy efficiency and keeps fabrication costs to a minimum. These properties make SGTs ideal for next-generation electronic devices, and could enable digital technologies to be incorporated into those built using flexible plastics or clothing textiles.

Such technologies may include ultra-lightweight and flexible gadgets which can be rolled up to save space when not in use, smart plasters, thinner than a human hair, that can wirelessly monitor the health of the wearer, low-cost electronic shopping tags for instant checkout, and

disaster prediction sensors, used on buildings in regions that are at high risk of natural disasters.

"These technologies involve thin plastic sheets of [electronic circuits](#), similar to sheets of paper, but embedded with smart technologies. Until now, such technologies could only be produced reliably in small quantities, and that confined them to the research lab. However, with SGTs we have shown we can achieve characteristics needed to make these technologies viable, without increasing the complexity or cost of the design," said lead researcher Dr Radu Sporea, Advanced Technology Institute (ATI), University of Surrey.

Professor Ravi Silva, Director of the ATI and a co-author of the work, said, "This work is a classic example of academia working closely with industry for over two decades to perfect a concept which has wide-reaching applications across a variety of technologies. Whilst SGTs can be applied to mainstream materials such as silicon, used widely in the production of current consumer devices, it is the potential to apply them to new materials such graphene that makes this research so crucial."

"By making these incredible devices less complex and implicitly very affordable, we could see the next generation of gadgets become mainstream much quicker than we thought," Dr Sporea concluded.

Provided by University of Surrey

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