

# Paper electronics could make health care more accessible

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Flexible electronic sensors based on paper—an inexpensive material—have the potential to some day cut the price of a wide range of medical tools, from helpful robots to diagnostic tests. Scientists have now developed a fast, low-cost way of making these sensors by directly printing conductive ink on paper. They published their advance in the journal *ACS Applied Materials & Interfaces*.

Anming Hu and colleagues point out that because [paper](#) is available worldwide at low cost, it makes an excellent surface for lightweight, foldable electronics that could be made and used nearly anywhere.

Scientists have already fabricated paper-based point-of-care [diagnostic tests](#) and portable DNA detectors. But these require complicated and expensive manufacturing techniques. Silver nanowire ink, which is highly conductive and stable, offers a more practical solution. Hu's team wanted to develop a way to print it directly on paper to make a sensor that could respond to touch or specific molecules, such as glucose.

The researchers developed a system for printing a pattern of silver ink on paper within a few minutes and then hardening it with the light of a camera flash. The resulting device responded to touch even when curved, folded and unfolded 15 times, and rolled and unrolled 5,000 times. The team concluded their durable, lightweight sensor could serve as the basis for many useful applications.

**More information:** "Direct Writing on Paper of Foldable Capacitive Touch Pads with Silver Nanowire Inks" *ACS Appl. Mater. Interfaces*, Article ASAP. [DOI: 10.1021/am506987w](https://doi.org/10.1021/am506987w)

## Abstract

Paper-based capacitive touch pads can be fabricated utilizing high-concentration silver nanowire inks needle-printed directly onto paper substrates through a 2D programmable platform. Post deposition, silver nanowire tracks can be photonicallly sintered using a camera flash to reduce sheet resistance similar to thermal sintering approaches. Touch pad sensors on a variety of paper substrates can be achieved with optimized silver nanowire tracks. Rolling and folding trials, which yielded only modest changes in capacitance and no loss of function, coupled with touch pad functionality on curved surfaces, suggest sufficient flexibility and durability for paper substrate touch pads to be used in diverse applications. A simplified model to predict touch pad capacitance variation ranges with differing touch conditions was developed, with good agreement against experimental results. Such paper-based touch pads have the advantage of simple structure, easy

fabrication, and fast sintering, which holds promise for numerous commercial applications including low-cost portable devices where ultrathin and lightweight features, coupled with reliable bending stability are desirable.

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