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## Origami Enabled Manufacturing

Origami is the art of folding flat sheets of paper into finished three dimensional structures. Manufacturing processes can also use folding techniques to improve existing products and create new products. A stent, used for cardiac applications, is a tubular metal mesh designed and built similarly to an origami object. Flexible solar cells, stretchable antenna arrays, and flexible displays require platforms for electronics that can withstand repeated folding and stretching. It is necessary to build these platforms in various sizes from the nano to the macro scale.

Researchers at Arizona State University have developed a universal manufacturing process that takes advantage of origami structures. This process allows for integration of soft and hard material to create electronic structures that reduce the amount of space they occupy. The innovation also improves the portability and performance of equipment and allows for flexible circuit boards that can change shape. Circuit boards can be built that stretch, fold, or adjust to meet new system configurations. The process provides for high speed manufacturing that will work with circuits of all sizes including nano to macro scale objects. The resulting products are extremely robust and simple.

### Potential Applications

- Consumer electronics that include flexible screen displays
- Defense and national security electronics
- Space exploration which uses electronics in satellite applications

### Benefits and Advantages

- Lower Costs – Requires little plant retooling and works within modern manufacturing technologies.
- Smaller – Allows electronics to be condensed into a smaller area.
- Flexibility – Provides engineers with the ability to design electronic devices in new and unique arrangements.

For more information about the inventor(s) and their research, please see [Dr. Hanqing Jiang's directory webpage](#)[Dr. Hongyu Yu's directory webpage](#)

