

# Discovery

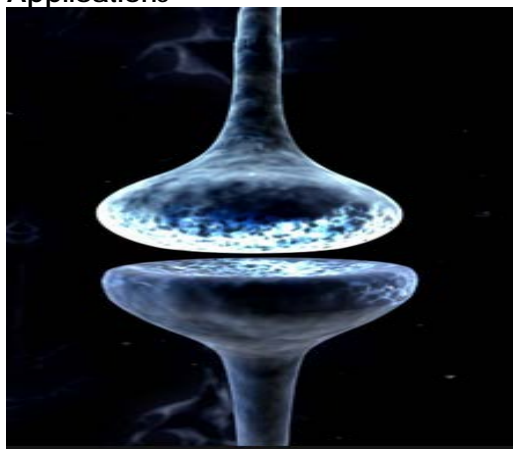
We SHARE to inspire and ignite ideas for  
Engineering Product Development (EPD) Pillar!

The titles featured here are to give you a peek into the wealth of resources we have. We hope, through this will encourage you to explore and read further. Share with us topics of importance to ISTD and we can introduce relevant titles from some [400,000 eBooks](#) we carry.

May 2016

## FACULTY WORKS

**Investigation and Manipulation of Different Analog Behaviours of Memristor as Electronic Synapse for Neuromorphic Applications**

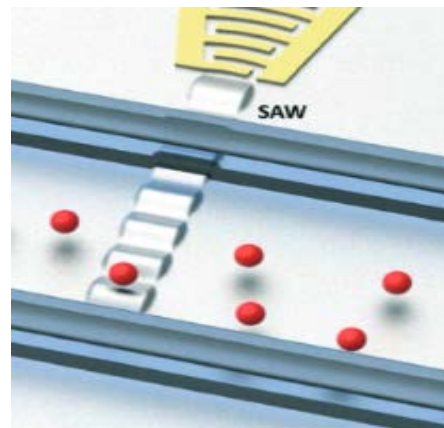


Co-authored by Associate Professor Zhao Rong

This [article](#) shows that compliance current ( $I_{comp}$ ) of the electroforming process helps in attaining a stable analogue behaviour. The research will prove useful in the design of electronic synapse with improved learning ability.

Source: [Scientific Reports](#) (March 2016)

**Highly focused high-frequency travelling surface acoustic waves (SAW) for rapid single-particle sorting**



Co-authored by Assistant Professor Ye Ai

Flow focusing and a highly focused SAW generated by a high-frequency, small wavelength set of focused inter-digital transducers (FIDTs) results in a narrow sorting region. This allows particles as small as 2 microns to be moved. Such high-speed sorting can be used in clinical and research applications.

Source: [Lab Chip](#) (2016)

## 3D PRINTING

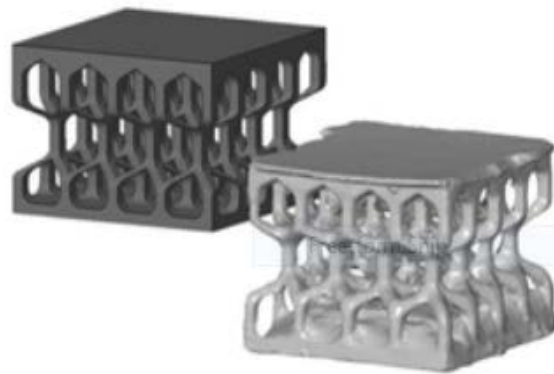
**3D Printing of Graphene Aerogels**



Read about a unique way to accomplish 3D printing of a graphene aerogel with 3D overhang structures [here](#). The water-based graphene oxide ink was freeze-casted into various 3D structures. This new graphene aerogel may be used for various applications. They include thermal insulation materials, strain sensor applications and in energy storage applications.

Source: [Small](#) (April 2016)

**3D Printing of Conductive Complex Structures with In Situ Generation of Silver Nanoparticles**



Combining reduction of a metal in the presence of light with 3D-printing enables 3D hybrid structures consisting of metal nanoparticles and organic polymers to be formed. This process is low in cost and rapid. The 3D structures produced have a multi-layered design. They can be used for energy dissipation purposes, such as in electronic device packaging.

Source: [Advanced Materials](#) (March 2016)

## MATERIAL SCIENCE

**Memory phenomenon in a lanthanum based bulk metallic glass**



Co-authored by IDC Researcher Ding Zhen

Two memory phenomena in a lanthanum based bulk metallic glass (BMG) were experimentally analyzed. Heating induced shape recovery was evident in samples deformed at both low and high temperatures. Such a phenomenon will prove useful in applications that require changes in the shape of objects, such as in configurable parts in devices.

Source: [Journal of Alloys and Compounds](#) (July 2016)

**Geometry- and Length Scale-Dependent Deformation and Recovery on Micro- and Nanopatterned Shape Memory Polymer Surfaces**



Co-authored by Associate Professor Low Hong Yee

The authors researched on enhancing surface functionalities in micro- and nano-scale surface textures. This research provides insights into how geometric features of shape memory surface patterns can be designed so that shape programming and recovery can be adjusted, and how reversibly deformable surface textures can be used to move very small liquid droplets.

Source: [Scientific Reports](#) (March 2016)

## SYSTEMS

### Inferring Activities and Optimal Trips: Lessons From Singapore's National Science Experiment



Co-authored by Assistant Professor Erik Wilhelm

Three new and efficient algorithms aimed at addressing three concerns in urban travel were created. Large-scale travel data was captured by a unique sensor developed by the Singapore University of Technology and Design with industrial partners. Simple algorithms helped in understanding the vast quantities of data collected by the sensors and helped the authors attempt to address three urban travel concerns.

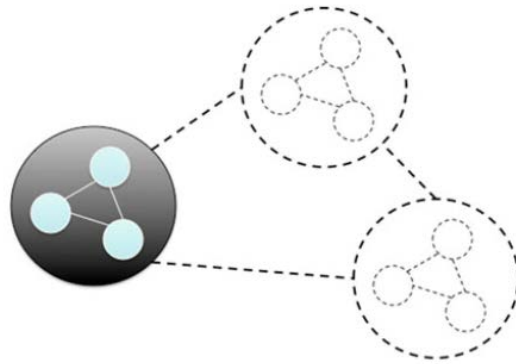
Source: [Complex Systems Design & Management Asia](#) (January 2016)

**CHECK THIS OUT!**

#### Special Feature on Robots

This [Special Feature on Robots](#) has a variety of articles pertaining to robots. Find out more about human relationships with robots, artificial intelligence and future directions in robotics.

### Expansionism-Based Design and System of Systems



Co-authored by Assistant Professor Luo Jianxi

Technological products and systems are getting more complicated. So, traditional reductionism-based design approaches, that emphasize decomposing and optimizing subsystems with their components, fail to meet the growing need for creativity in systems design. You will discover in this [article](#), that expansionism-based design can serve as a good alternative. This is attributed to it not having to address the internal complexity of existing systems.

Source: [Complex Systems Design & Management Asia](#) (January 2016)

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