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.

June 2016

FACULTY WORKS

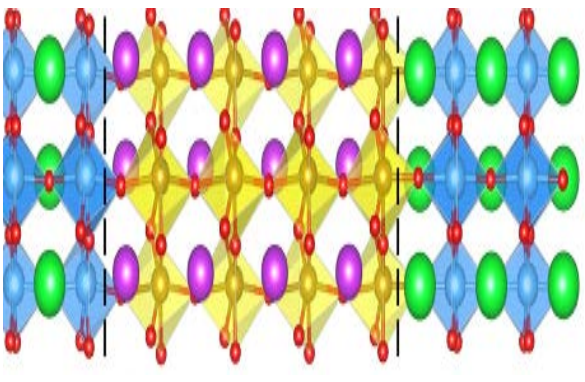
Large Area Plasmonic Colour Palettes with Expanded Gamut Using Colloidal Self-Assembly

Co-authored by Assistant Prof Joel Yang

Optical resonances in metallic nanostructures show potential in enabling high-resolution plasmonic colour prints, colour filters, and in rendering colors for plastic consumer products. Yet, there is a problem of low output in nanostructure patterning via charged-beam lithography. The authors developed a quick and inexpensive method for nanostructure patterning.

Source: ACS Photonics (2016)

Tunable electronic and magnetism of $SrTiO_3/BiFeO_3$ (001) superlattice: For electrochemical applications

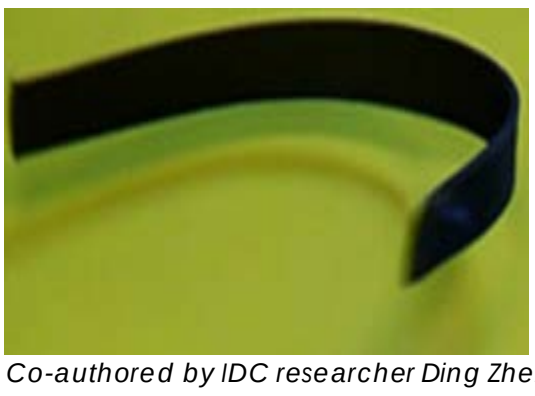


Co-authored by lecturer Franklin Anariba

Find out about a practical strategy in adjusting the conductivity and magnetism of the $SrTiO_3/BiFeO_3$ (001) superlattice structure. The research on this practical strategy may be useful in electrochemical applications like magnetic-field aided chemical gas sensing, solar cells, and photo-catalytic chemical reactions.

Source: Applied Physics Letters (2016)

Multi-shape active composites by 3D printing of digital shape memory polymers

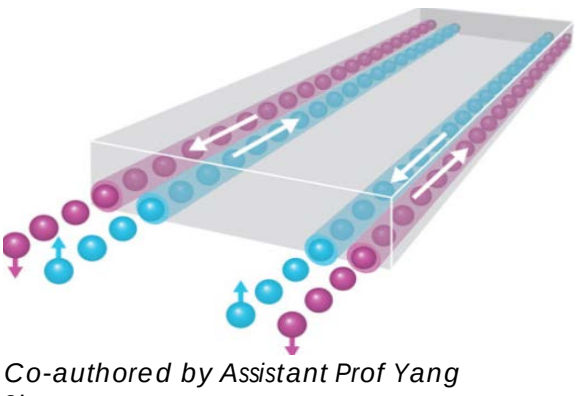


Co-authored by IDC researcher Ding Zhen

Learn about the design and manufacture of shape memory polymer (SMP) composites that can take multiple shapes, depending on the environmental temperature. With the advantages of a non-complicated design process and the adjustable multi-shape memory effect, the printed SMP composites can eventually be used in 4D printing applications.

Source: Scientific Reports (April 2016)

All-electric spin modulator based on a two-dimensional topological insulator

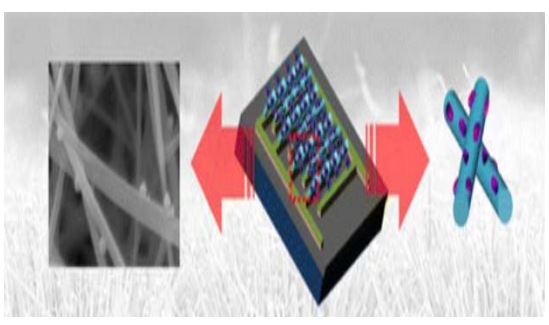


Co-authored by Assistant Prof Yang Shengyuan

Discover an innovative spin modulator device. It has the advantage of having adjustable conductance. This feature can be particularly useful in a spin-polarization rotator.

Source: Applied Physics Letters (2016)

Highly Selective Sensing of CO, C_6H_6, and C_7H_8 Gases by Catalytic Functionalization with Metal Nanoparticles

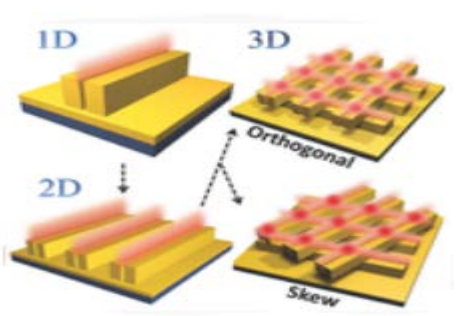


Co-authored by Associate Prof Wu Ping

The authors fabricated very thin SnO_2 wires that were each coated with different types of metal nanoparticles. These wires were used to sense for the presence of 3 types of gases. This study is expected to be a crucial step in the development of gas sensors which have strong selective sensing ability.

Source: ACS Applied Materials & Interfaces (March 2016)

From 1D to 3D: Tunable Sub-10 nm Gaps in Large Area Devices

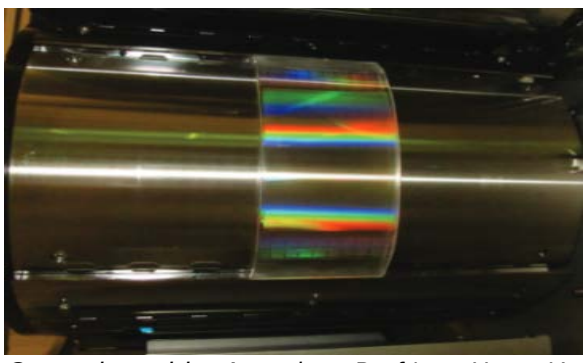


Co-authored by Assistant Prof Joel Yang

This article investigates the electric field in nanogaps of varying sizes. It was found that the optimal nanogap size was 5 nm. This study will pave the way for the use of nanogaps in large areas with low cost for applications that require the confinement of electromagnetic energy, particularly in spectroscopic applications.

Source: Advanced Materials (2016)

Multi-functional silicone stamps for reactive release agent transfer in UV roll-to-roll nanoimprinting



Co-authored by Associate Prof Low Hong Yee

This study investigates the use of multi-functional silicone stamps designed for production of polymer resin moulds. The purpose of the silicone is to function as both a lithographic template and a release agent transfer vehicle without further processing steps being necessary.

Source: Materials Horizons (March 2016)

An Android app for recording hand hygiene observation data

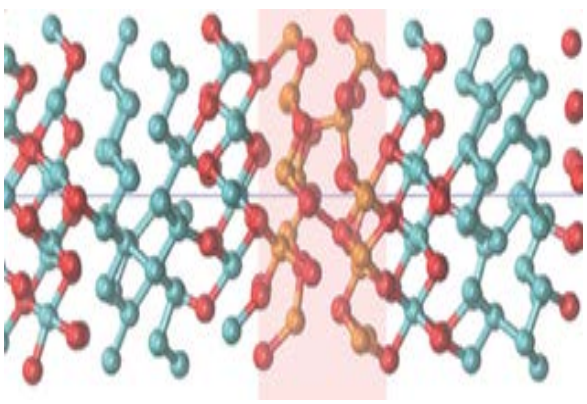
Co-authored by Assistant Prof Yuen Chau

Presenting an innovative Android app for tomorrow's healthcare needs! It is designed to monitor hand hygiene in healthcare settings. It is an efficient way to record, transport and analyse data pertaining to hand hygiene. For more information on the app, please refer to this website.

Source: Journal of Hospital Infection (April 2016)

MATERIAL SCIENCE

Phase-Change Memory Materials by Design: A Strain Engineering Approach

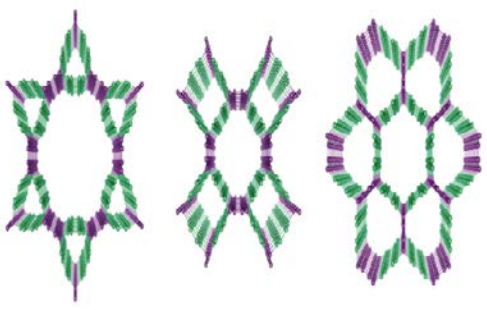


Co-authored by Assistant Prof Robert E Simpson

Find out about the design of phase-change memory materials here. The authors strain-engineered superlattices of Sb_2Te_1 and GeTe to encourage switchable atomic disordering, only in the GeTe layer. Adjusting the strain in the superlattices is a revolutionary way to design the properties of functional superlattice structures for data storage and photonics applications.

Source: Advanced Materials (April 2016)

Towards three-dimensional Weyl-surface semimetals in graphene networks



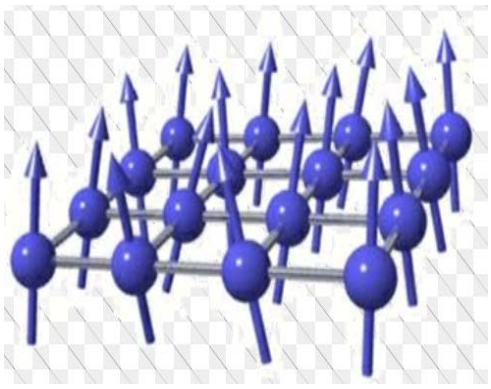
Co-authored by Assistant Prof Yang Shengyuan

Learn about a new class of materials here. They are the Weyl semimetals based on three types of 3D graphene networks. They feature unique atomic and electronic structures that will allow them to be eventually used in applications such as energy storage and catalysis.

Source: Nanoscale (2016)

QUANTUM PHYSICS

Protection of quantum correlations against decoherence

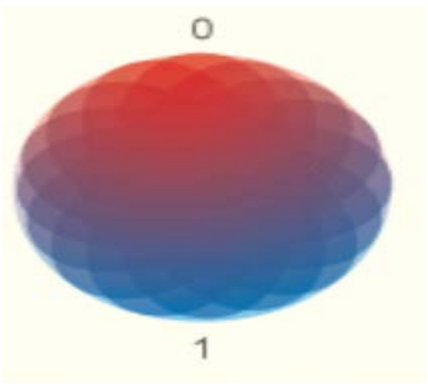


Co-authored by Lecturer Wu Chunfeng

Protecting different quantum correlations, such as Bell non-locality and quantum discord, against decoherence is analyzed. The authors illustrate that the mentioned quantum correlations can be effectively preserved probabilistically from the decoherence due to amplitude damping. Their results will prove useful in experiments utilizing the quantum correlations.

Source: Quantum Information Processing (February 2016)

Permutation-invariant codes encoding more than one qubit



Co-authored by Assistant Prof Joseph Fitzsimons

Discover permutation-invariant codes that can encode a large quantity of quantum information. At the same time, they can also prevent spontaneous decay errors. These codes could be used in various quantum applications such as quantum communication along isotropic Heisenberg spin chains.

Source: Physical Review A (April 2016)