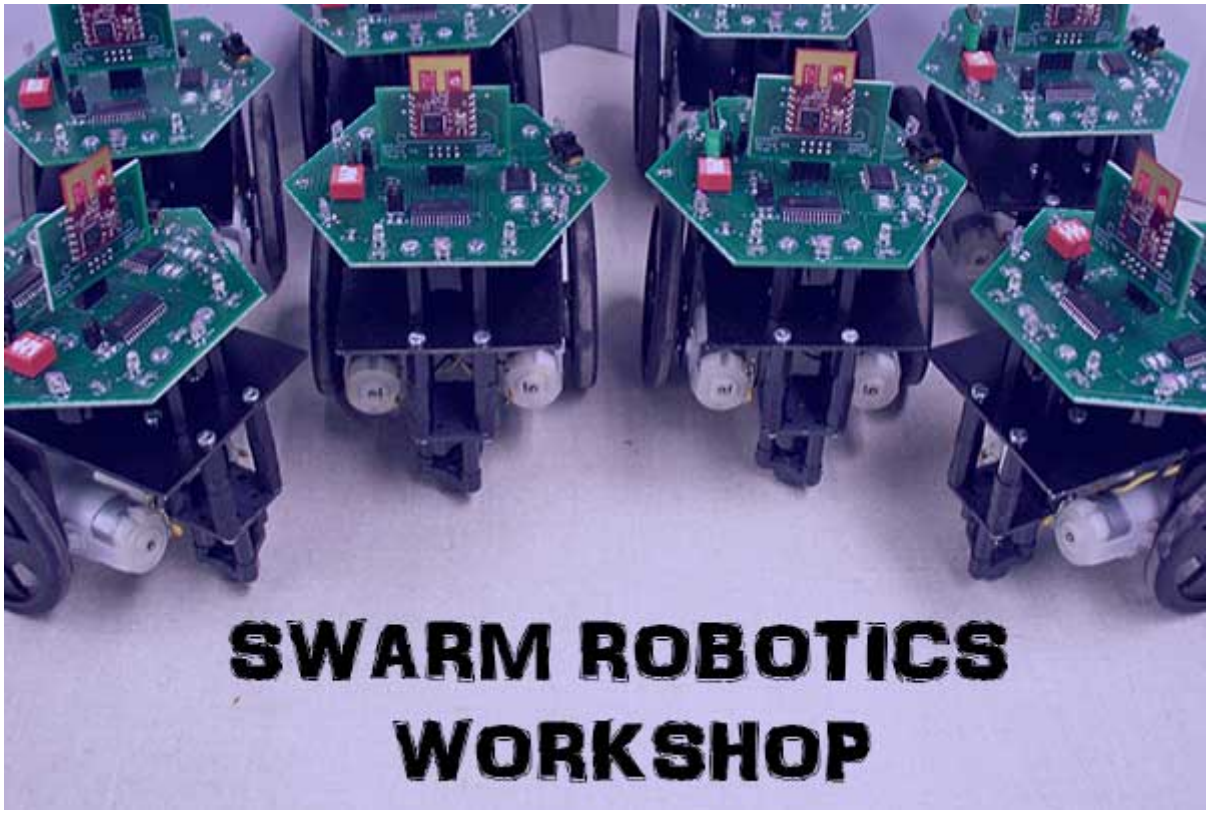
IEEE Brainwaves

IEEE Brainwaves Newsletter is published by the IEEE Brainwaves student chapter of D.J. Sanghvi College of Engineering

IEEE Brainwaves Feature Events :

IEEE Brainwaves Workshops



The IEEE Brainwaves committee counducted the following set of workshops:
SOLAR AND SMART ENERGY SYSTEMS WORKSHOP
The Solar and Smart Lighting System Energy Workshop imparts comprehensive practical knowledge about renewable energy sources. The course covers the fundamentals of various types of alternative energy sources and associated applications. The training focuses on working projects relating to smart lighting systems and solar-powered mobile charger development. This equips participants with application-based proficiency on alternative energy sources.
Understanding of Renewable Energy and Alternative Energy Sources
Designing and Development of Solar-powered Mobile Charger and smart lighting systems

Exposure to Embedded systems and micro-controller programming and sensors
Practical experience with Live working projects on Solar Panels.
Practical experience of using Solar Panels.

SWARM ROBOTICS
Swarm Robotics deals with the Artificial Swarm Intelligence and involves the usage of multiple Robots which coordinate among themselves to complete a mission. The Swarm robots communicate with each other wirelessly and take decisions. This workshop involves development of autonomous swarm robots enabled with master-slave communication.The master robot controls the slave robot while performing its own task and the slave robot functions based on the signal received from the master robot (both being autonomous).
Understanding Swarm Intelligence, Interfacing Sensors, Wireless Communication and Micro controller Programming
Understanding Machine to Machine Communication
Development of Autonomous Robots which send signals to communicate with each other
Micro controller Programming to receive signals from other Robots and behave accordingly
Introduction to structure and programming of micro controllers
Practical experience for participants with DC motors, Radio Frequency Modules, Micro controllers, Infrared Sensors, etc.

IEEE Spectrum Article :

How to Make a Better Invisibility Cloak—With Lasers

Direct laser writing creates metamaterial structures small enough to manipulate visible light

For a century or more, nearly all technological advances have depended on our ability to produce and manipulate the vast variety of materials that nature has given us. Nowhere is that dependence more evident than in the field of electronics. From a smorgasbord of semiconductors, polymers, and metals, we've been able to create a dazzling array of circuitry that now underpins pretty much every aspect of modern life.

So now imagine what we could do if we weren't limited to the materials found in nature. Researchers have long believed that it would someday be possible to produce artificial materials, or "metamaterials," and that they would bring about some stunning, otherworldly technologies—the sort that have figured in science fiction tales for years. These innovations include invisibility cloaks that could mask the presence of objects or their electromagnetic signatures, "unfeelability cloaks" that could mechanically mask the tactile feel of an object, superlenses that could resolve features too small to be seen with ordinary microscope lenses, and power absorbers that could capture essentially all of the sunlight hitting a solar cell.

To achieve these advances we'll need better metamaterials, and those are on the way. Metamaterials are made up of "meta-atoms"—small two- or three-dimensional structures made of polymer,

dielectric material, or metal. When these structures are arranged in regular, repeating crystals, they can be used to manipulate electromagnetic radiation in new ways. Ultimately, the capabilities of a metamaterial are determined by the size, shape, and quality of these structures. And the technology to fabricate meta-atoms has recently turned a corner.

Over the past few years, research groups around the world have succeeded in developing a way to draw meta-atoms using lasers. The resulting structures can now take on nearly any shape and be stacked in three dimensions in dense, crystal-like arrangements. What's more, they can be made small enough to exhibit unique mechanical and thermal properties and to alter the flow of light in a range of wavelengths—including the long-inaccessible visible chunk of the spectrum. Thanks to this microscopic fabrication technology, we can finally see a path beyond the materials nature has provided us into entirely new realms that are limited only by our imaginations.

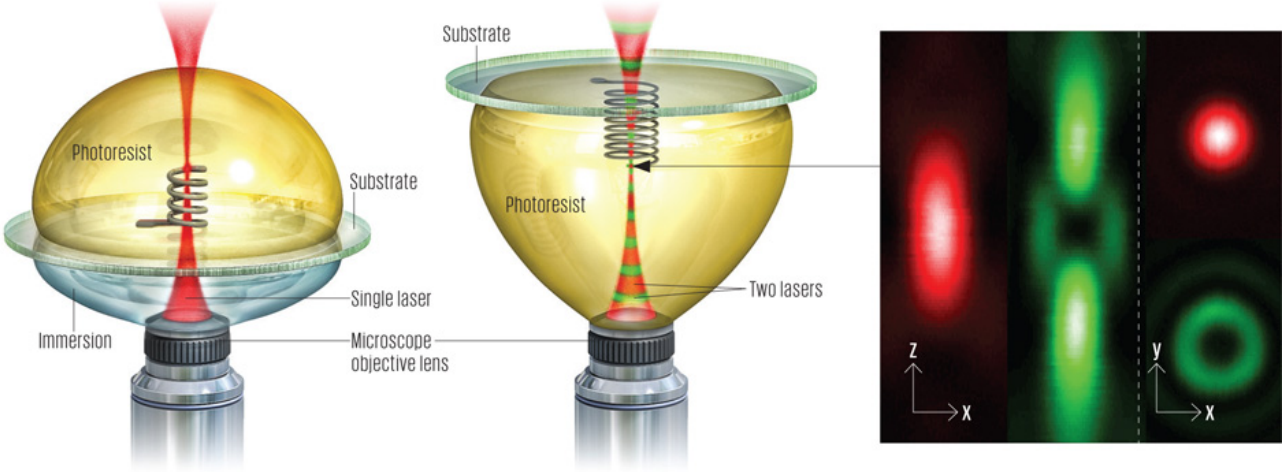


Illustration 1: The Two-Beam Solution: A single laser beam shone upward through a microscope objective lens and a glass slide [left] can be used to draw 3-D structures inside a photosensitive compound called photoresist. But two innovations [center] have helped improve the writing process. One is to use two lasers: a red one to excite the photoresist and a green one to de-excite all but a central point so that much finer features can be drawn. The vertical and horizontal cross sections of both beams are shown at right. The process got a second boost from a recently discovered photoresist. The optical properties of this compound can be tuned so that it can also act as the immersion liquid, which carries light from the objective lens. This allows taller structures to be built, because the microscope slide won't get in the way.

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