

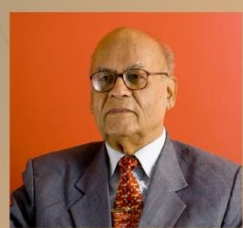


# Elektrikus...

Issue-3

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## As the chiefs say



From an initiative 3 years back to a tradition now, The e-newsletter has explored all limits of knowledge. I extend my heartfelt greetings to all participants, authors, faculty staff and students associated in this endeavor.

Er. DC Jain  
Chairman  
(Gyan Ganga Group)



It is a matter of great happiness to me to know that the students have continued the e-newsletter for such a long time with great efficiency. Each edition comes out better than the previous and I have similar hopes from this one.

Mr. Rajneet Jain  
Secretary  
(Gyan Ganga Group)



I am very pleased to know that our college team is coming out with another issue of the e-newsletter. I heartily congratulate the editorial team. We expect to put a lot of technical knowledge to the readers from this e-newsletter.

Mr. Pankaj Goyal  
Executive Director  
(Gyan Ganga Group)



This effort of the students will be surely appreciated by one and all. Along with academics, the different activities in college are the keys that will unlock the hidden talents and thoughts in students.

Mr. Apurva Singhai  
Executive Director  
(Gyan Ganga Group)



It is joyous to know that the students are continuing the legacy of the e-newsletter as it shall help in spreading the activities being conducted by the institute to the public. I wish the team good luck.

Dr. Maneesh Choubey  
Group Director  
(Gyan Ganga Group)



It gives me immense pleasure to know that another edition of Elektrikus is coming out. I wish all the success to the team of the EC branch involved and hope that this edition will also benefit the students in a great manner.

Dr. RK Ranjan  
Principal  
GGITS, Jabalpur



I am confident that this e-newsletter will provide relevant data about technology and latest happenings around the globe to all the budding engineers of our college. My best wishes to the team for future prospects.

Prof. P.K. Jain  
Head (Examination Cell)  
GGITS, Jabalpur



This new edition of Elektrikus has loads of exciting updates. Technology and time never stop and the updates here keep account of the latest developments. My warm wishes to the Gyan Ganga Group for the publication of this e-newsletter.

Prof. Vinod Kapse  
Head (EC Department)  
GGITS, Jabalpur



With already the so many incredible issues previously, I congratulate the editors on handling the pressure well and coming out with yet another brilliant edition of Elektrikus. We truly are "Committed for Excellence".

Prof. Pankaj Sahu  
Faculty Co-ordinator



Rahil Minocha 5th Semester

Contributing to the department newsletter Elektrikus has always been special.



Mitul Chakraborty 3rd Semester

The experience of publishing the newsletter has been enriching to the core. Hope you all like it.

## IN THIS EDITION:

*Butterfly Wing Electronics*

*Self Warming Clothes*



# **The Department**

## **Vision**

To be centre of excellence in teaching-learning and employability in various fields of Electronics and Communication Engineering to produce globally competent, innovative and socially responsible citizen.

## **Mission**

1. To offer high quality graduate and post graduate programs in Electronics and Communication with strong fundamental knowledge and to prepare students for professional career or higher studies
2. To discover and disseminate knowledge through learning, teaching, sharing, training, research, engagement and creative expression.
3. To foster spirit of innovation and creativity among students, faculty and staff, promote environment of growth, participation in conferences, technical and community services and lifelong learning for all.



## Butterfly Wing Electronics Converts LIGHT Into

Future of [nanoscale](#) electronics might be found on the back of a butterfly. A team led by Eijiro Miyako from the National Institute of Advanced Industrial Science and Technology used the patterns on the surface of [Morpho sulkowskyi](#) butterfly wings as a template to build carbon nanotube networks that can convert light to heat and replicate DNA sequences.

But their creation isn't just inspired by nature. It is a real hybrid of butterfly wings fused with nanocarbon that imitates traits found in nature but is also tough to reproduce through technology alone. It could potentially play a role in digital diagnosis of disease, power flexible microscopic [photovoltaic cells](#) or even help create soft wearable electronics.

The surface of *Morpho* wings are essentially covered in nanoscale solar cells, honeycomb-like structures that trap light, much like a fibre-optic cable, and convert it to heat to keep the insect warm in cold environments. Miyako deposited carbon nanotubes onto the butterfly wings, where they self-assembled into nanostructures that mimic the *Morpho*'s multilayered hexagonal microstructures. The resulting hybrid gives the term "bio-tech" new meaning: the natural pattern provided by the wings creates a large light-receiving surface area, and the physical properties of nanocarbons produce heat through vibrational energy. Lab tests confirmed that the nanotubes generate heat when struck with a laser, and Miyako says the composite material heats faster than its two components would by themselves.

It also exhibits high electrical conductivity and can also be used to make it easier to replicate DNA. *Morpho* wings contain layers of scales that make their surface superhydrophobic and self-cleaning. Miyako exploited this feature to initiate a method of DNA replication where drops of enzyme solution are laser-heated on the nanotube hybrid's surface. The nanocarbon network stops the material from absorbing the DNA, while the wing's water-shedding ability moves the drop away from the laser so that the process can be rapidly repeated.

"The carbon nanotube biocomposite will be very flexible and light even if it's scaled up," Miyako says.

Scaling up, however, will be rather complicated. "Maybe we should feed a lot of butterflies in factories or something like that. What do you think?" says Miyako.

Journal reference: *ACS Nano*



# Keep snugly warm with self-heating nanowire clothes

by [Jacob Aron](#)

The winter months can bring eye-watering heating bills as you struggle to fight off the cold. Much of that energy is wasted warming up empty air rather than people. A new form of cloth designed to directly heat your skin could provide a solution.

Almost half of global energy is spent on indoor heating, according to a recent [International Energy Agency report](#). While not all of that is wasteful – buildings need to be heated to keep pipes from freezing, for instance – that figure must come down if we are to reduce carbon emissions.

So [Yi Cui](#) of Stanford University in California and his colleagues want to change the way we keep warm. The team has developed a technique for coating textiles in a network of silver nanowires by dipping cloth in nanowire "ink".

"The process of making the nanowire cloth is as simple as dyeing," says Cui. "The nanowires stayed on the cloth and formed a conductive network which can reflect human body heat radiation and keep us warm."

## Personal heating

Ordinary clothes provide an insulating layer that traps heat against your skin, but the material can still lose heat to the surrounding air. The nanowire cloth acts as a reflecting surface for heat, keeping you warm, but is porous enough to let water through so you don't feel sweaty.

What's more, because the nanowire cloth conducts electricity, running a current through it heats it up to provide extra warmth. "Just 1 volt can heat up the nanowire cloth to 40 °C," says Cui. Keeping the current low means there is no danger of burning your skin. "It is just like holding a AAA battery."

[George Havenith](#) of Loughborough University, UK, thinks the nanowire cloth is a good idea, but it might be difficult to convince the public to use it – after all, some people prefer to crank the heat up rather than wear a sweater over their t-shirt. "This stuff has to cover most of your body to be effective," he says.

Journal reference: [Nano Letters](#), DOI: [10.1021/nl5036572](#)