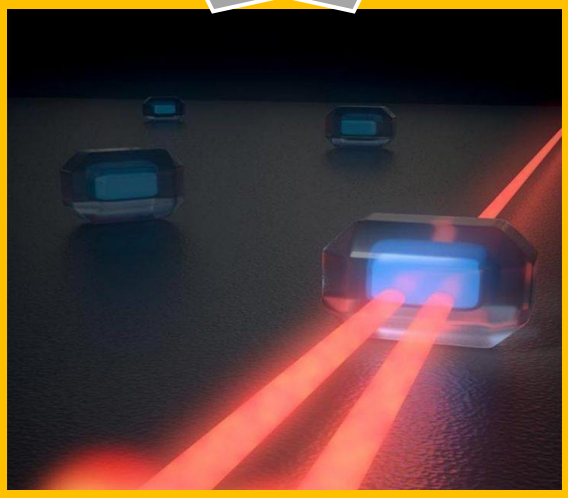
DEPERTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Tele Electro

NEWSLETTER

Volume 6 - Issue 3

2019-20



Contents

- About College
- About Department
- Principal's Message
- HOD's Message
- Faculty Articles
- Student Articles
- And more.....

DHANEKULA INSTITUTE OF ENGINEERING AND TECHNOLOGY :: GANGURU

DHANEKULA INSTITUTE OF ENGINEERING & TECHNOLOGY::GANGURU

Institute Vision

Pioneering Professional Education through Quality.

Institute Mission

1. Quality Education through state-of-art infrastructure, laboratories and committed staff.
2. Moulding Students as proficient, competent, and socially responsible engineering personnel with ingenious intellect.
3. Involving faculty members and students in research and development works for betterment of society.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Vision

Pioneering Electronics and Communication Engineering Education & Research to Elevate Rural Community

Mission

- Imparting professional education endowed with ethics and human values to transform students to be competent and committed electronics engineers.
- Adopting best pedagogical methods to maximize knowledge transfer.
- Having adequate mechanisms to enhance understanding of theoretical concepts through practice.
- Establishing an environment conducive for lifelong learning and entrepreneurship development.
- To train as effective innovators and deploy new technologies for service of society.

Principal's Message

Dear Parents and Students,

It is with great pleasure that I welcome you to our College (DIET) Newsletter.

As Principal I am hugely impressed by the commitment of the college and the staff in providing an excellent all-round education for our students with our state of the art facilities. We as a team working together, strongly promote the zeal towards academic achievement among our students. The cultural, sports and other successes of all our students and staff are also proudly celebrated together. I congratulate the staff and students who brought latest technologies and concepts onto the day to day teaching learning platform. As long as our ideas are expressed and thoughts kindled, we can be sure of learning, as everything begins with an idea.

I appreciate every student who shared the joy of participation in co-curricular and extracurricular activities along with their commitment to curriculum. That little extra we do, is the icing on the cake. 'Do more than belong – participate. Do more than care – help. Do more than believe – practice. Do more than be fair – be kind. Do more than forgive – forget. Do more than dream – work.'

With a long and rewarding history of achievement in education behind us, our DIET community continues to move forward together with confidence, pride and enthusiasm.

I hope you enjoy your visit to the website, and should you wish to contact us, please find details at the www.diet.ac.in/

Yours in Education,

Dr.Ravi Kadiyala
Principal

HOD's Message

The Department of Electronics & Communication Engineering (ECE) has consistently maintained an exemplary academic record. The greatest asset of the department is its highly motivated and learned faculty. The available diversity of expertise of the faculty with the support of the other staff prepares the students to work in global multicultural environment. The graduates of the Electronics & Communication Stream have been selected by some of the world's leading corporations & as well as by most of the leading Indian counter parts. We hope that we will continue to deliver our best to serve the society and mankind. It is also expected that our students will continue to pass-on the skills which they have developed during their stay at this department to whole of the world for a better society.

Dr.G.L.Madhumati

Professor & HOD

Dept.of ECE

Dhanekula Institute of Engineering & Technology

Editor's Note

Dear Readers,

It gives us great pleasure to bring you the first issue of **Tele-Electro** for the academic year 2019-20, the Department newsletter of Dhanekula Institute of Engineering & Technology, Ganguru.

The name and fame of an institute depends on the caliber and achievements of the students and teachers. The role of a teacher is to be a facilitator in nurturing the skills and talents of students.

This Newsletter is a platform to exhibit the literary skills and innovative ideas of teachers and students. **Tele-Electro** presents the achievements of students and contributions of teachers.

We profusely thank the management for giving support and encouragement and a free hand in this endeavor. Last but not the least we are thankful to all the authors who have sent their articles. We truly hope that the pages that follow will make an interesting read.

Mr.S.Chandrasekhar
Coordinator
G.U.Maheswara Reddy
Student Coordinator
G.Nagaraju
Student Coordinator

FACULTY ARTICLES

T-Shirt Generates Electricity From Body Temperature Difference to Surroundings

Researchers of the Faculty of Science of the University of Malaga (UMA) have designed a low-cost T-shirt that generates electricity from the temperature difference between the human body and the surroundings. Credit: University of Malaga

Researchers of the Faculty of Science of the University of Malaga (UMA) have designed a low-cost T-shirt that generates electricity from the temperature difference between the human body and the surroundings. We are talking about the "e-textile" prototype, developed in collaboration with the Italian Institute of Technology in Genoa (IIT) based on sustainable methods and low-cost materials like tomato skin.

"So far, metals have been the chemical elements commonly used in the fabrication of electronic devices. This project took a step forward, and we have been able to generate electricity by using light and more affordable and less toxic materials", explains José Alejandro Heredia, one of the authors of this project.

The formula is very simple: water and ethanol -a type of ecological alcohol- derived from tomato skin and carbon nanoparticles. A solution that, according to experts, when heated, penetrates and adheres to cotton, thus obtaining electrical properties, like those generated by tellurium, germanium or lead, but from biodegradable materials. "When someone walks or runs, warms up. If such person wore a T-shirt designed with these characteristics, the difference between his/her body and the colder temperature of the surroundings could generate electricity", says Susana Guzmán, another author from the UMA.

"Iron Man" made in UMA

The results of this project, in which the Italian researcher Pietro Cataldi has participated, were **published** in the journal *Advanced Functional Materials*. At present, this group of scientists continues their work on the development of devices that can be incorporated into textile to be able to, for example, generate light to make this T-shirt reflective or even charge a mobile phone without a charger.

Researchers of the Faculty of Science of the University of Malaga (UMA) have designed a low-cost T-shirt that generates electricity from the temperature difference between the human body and the surroundings. Credit: University of Malaga

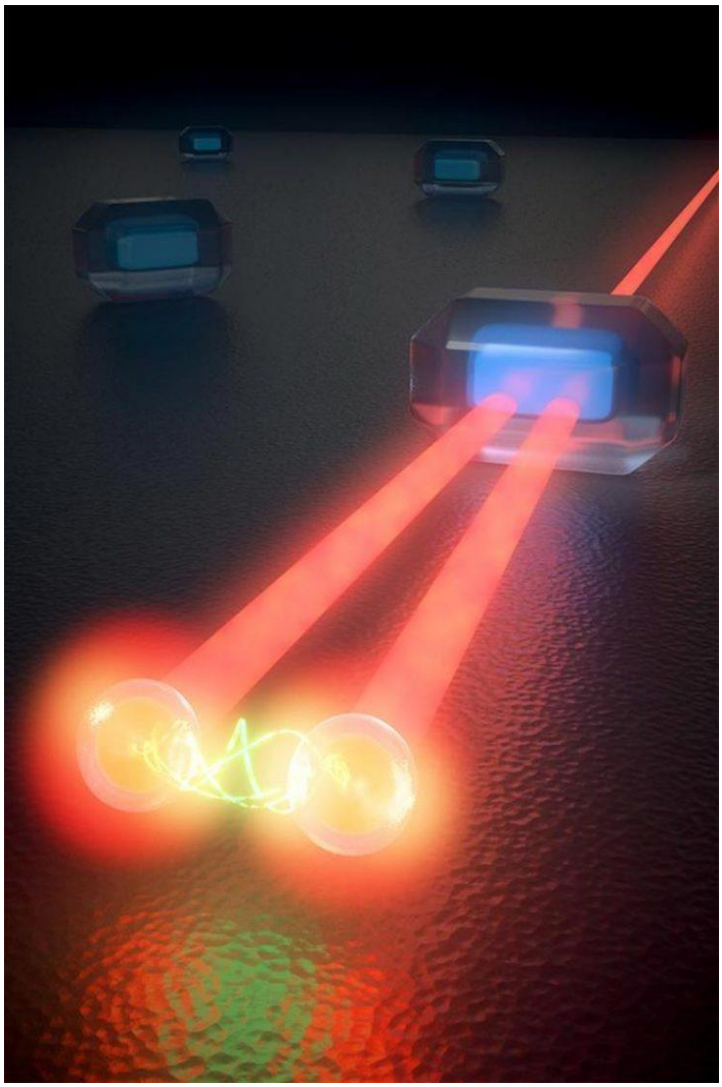
Other possible applications include biomedicine, thanks to the monitoring of signals of each user, or robotics, because the use of these lighter and more

flexible materials enables improvement of robot features.

In a previous study, we were able to create a Wi-Fi antenna from tomato skin and graphene. We are also studying the possibility of incorporating this invention into the "e-textile" T-shirt, which would enable us to be like the superhero Iron Man, who wears a suit with all types of technological devices, and even fly.

Article by:
Mr.S.Chandrasekhar Asst.Prof, ECE

New Technique for Studying Ultrafast Events in Individual Quantum Dots



Upon stimulation, two photons emerge from the quantum dot giving detailed information about the dynamics of the excited charges within the Quantum Dot (QD).

Ultrafast Stimulated Emission Microscopy of Single Nanocrystals

The ability to investigate the dynamics of single particle at the nano-scale and femtosecond level remained an unfathomed dream for years. It was not until the dawn of the 21st century that nanotechnology and femtoscience gradually merged together and the first ultrafast microscopy of individual quantum dots (QDs) and molecules was accomplished. Ultrafast microscopy studies entirely rely on detecting nanoparticles or single molecules with luminescence techniques, which require efficient emitters to work. However, such techniques cause degradation to the sample, as well as, yield little information about the dynamics of the system in the excited state. Only in recent years, the efforts to find an alternative compatible technique to study fast processes in nano-objects came into the spotlight.

Now, ICFO researchers Lukasz Piatkowski, Nicolò Accanto, Gaëtan Calbris, Sotirios Christodoulou, led by ICREA Prof. at ICFO Niek F. van Hulst, in collaboration with Iwan Moreels (Ghent University, Belgium), have published a study in **Science** entitled "Ultrafast stimulated emission microscopy of single nanocrystals," where they report on a technique for studying ultrafast events in individual non-fluorescent nano-objects.

In their study, they took individual QDs and rather than waiting for the QD to spontaneously emit light through photoluminescence, the team used a sophisticated combination of laser pulses to promote individual QDs into excited state and then, force them down, back to the ground state to first: image individual QDs and second: discern the evolution of the excited charges within the entire photocycle.

Dr. Lukasz Piatkowski explains why they used a laser pulse pair to effectively image the dynamics of the QDs: "It is like throwing a ball into a tree; the higher you throw it, the more excited the state. The first laser pulse of the system (photon) throws the first ball (charge in the QD) into the tree. If you are using a photoluminescence technique it is like you are standing below the tree, and you cannot see what is happening inside the treetop or crown. Thus, you will not know whether the ball starts to bounce down the branches, where, when and how is starts to fall down, if it stomps with something on its way, if it gets caught in an intermediate branch, etc. So, in order to see what is happening with the first ball, you need to find another technique that allows you to look into the treetop. The technique we used allowed

us to throw a second ball into the tree top (second laser pulse interacting with the QD) to bring the first ball down. Throwing the second ball higher or lower, stronger or weaker, sooner or later after the first ball, we obtain information about the first ball and the structure of the tree (how long it took the balls to fall out, where, how, etc.) “.

In their experiment, the first laser pulse brings individual QD to the excite state. Then, every few hundred femtoseconds, they shot a second laser pulse onto the QD to bring the charges down to ground state, inducing recombination and emission of an extra photon. Hence, for every probe photon they shot into the system, they got two twin photons back. These extra photons allowed the authors not only to image the QDs but also to precisely track the evolution of the excited charges in the QD, unveiling how many charges underwent spontaneous recombination, stimulated recombination and excited state absorption.

Being able to track excited charges at the nanoscale is of fundamental importance in nanotechnology, photonics, and photovoltaics. The results of the study have proven that ultrafast stimulated emission microscopy can be used to study ultrafast processes in individual chromophoric particles that are otherwise undetectable through fluorescence/photoluminescence techniques. In other words, such study has permitted imaging and studying the dynamics of nano-particles and structures without the need of external fluorescent labels.

As ICREA Prof at ICFO Niek van Hulst remarks, “Significant advances are expected in the future within the field of ultra-fast-nano-regime imaging techniques. The first detection of quantum dots using this approach has been outstanding. We now aim to extend this to molecules and biomolecular complexes, specifically photo-synthetic complexes. We are currently working on 3 and 4 pulse schemes to merge the stimulated emission and luminescence detection of single systems with 2D-spectroscopy.

Article by:
Mr.A.Sivannarayana Asst.Prof, ECE.

STUDENT ARTICLES

How Does Your Brain Make Everyday Decisions?

Hot coffee or cold brew? Pizza or pasta for dinner? These are the decisions that guide our everyday lives. What computations do our brains make when weighing these choices?

At Columbia’s Zuckerman Institute, Akram Bakkour, Ph.D., a postdoctoral research scientist in the Shohamy lab, investigates the ways in which our brain incorporates our memories and past experiences into the everyday decision-making process. He and his Zuckerman Institute collaborators, including Principal Investigators Daphna Shohamy, Ph.D., and Michael Shadlen, MD, Ph.D., recently found that the hippocampus, the brain’s memory center, plays a central role in this deliberation process.

Article by:
K.Meghana, Roll No:178T1A0452

To See the Invisible – Scientific Astonishment and Two-Photon Vision

It started with scientific astonishment. Why is there a green glow when looking at an infrared emitting device? “Such a strange phenomenon was observed by my colleagues when they installed an imaging device at the Nicolaus Copernicus University in Toruń,” says Prof. Wojtkowski. “They came to me sharing this interesting observation that although they use infrared, which should no longer be visible, they still see something; such a weak, greenish light. And why did they look into the assembled device? “Well,” laughs the professor, “such human nature and curiosity. Every time you assemble something, you look inside. It’s true that it’s always risky to look in such device, because the infrared source is the laser, but it’s safe to do so while maintaining the laser’s power in accordance with the standards.”

The scientists’ first thought was that the laser was broken and, in addition to infrared (light wavelength similar to that used in old TV remote controls) generated green light. So they dismantled the laser and meticulously checked what could have broken down. They found nothing. Then someone came up with the simple but ingenious idea to put a filter in front of the eye of the observer, which would cut off visible light. They found the correct filters, put them between the laser and the eye and … to their surprise the effect remained. “Our jaws dropped a little because that meant that the device was fine, but something strange was happening in the eye,” says the professor. “Fortunately, there was another, very good laser at hand that generated ultra-short pulses of light and could be used to adjust the wavelength, of course in the infrared range. We started to change this length and it turned out that each one evoked a different color effect in the eye — we could perceive various colors! What’s more, not weakly, but very clearly.” As it happens with such discoveries, it turned out that people had observed it before, but nobody had any idea how to explain it, or they couldn’t interpret it correctly.

This unexpected color vision turned out to be two-photon vision. “Luckily, at that time we were being visited by Professor Krzysztof Palczewski, who is a biochemist working in the USA and dealing with vision processes,” recalls Professor Wojtkowski. “He was very interested in our discovery. So much so, that he organized a group of experts in various fields (including our team) to explain the mechanism of this vision. Tests were performed on mice, including genetically modified ones. Kasia Komar and Patryk Stremplewski from my team carried out tests on people, because our main expertise is in measurements on living eyes,” explains the professor. “After collecting all the results, it turned out that we were dealing with two-photon vision.” This involves the retina receiving a portion of energy half as low as the minimum required for the reaction of photosensitive cells, but very concentrated in time and space; and if the impulse is delivered, then the subject, e.g. a human, sees it as if it were twice as high. It’s a bit like throwing small plasticine balls onto a board twice, in the same place and time. The imprint of both balls merges on the board into a larger, visible one. You can also imagine being hit on the head with these sorts of balls. We wouldn’t feel any one of them singly, but a double portion could give us a bruise. This is what happens in the quantum world, the condition being that you have to throw these balls close enough to themselves and appropriately close to one another in time — so that they basically stick together into larger blobs. Physicists call this the optical non-linear effect. Such effects are known for many materials, but it is not obvious that they can occur in doses that are safe, e.g. for the eye. “Until we’d dealt with this ourselves, I myself had thought that two-photon absorption in the eye could occur only once (in principle, once in one eye, once in the fellow eye),” laughs the professor, “After which it wouldn’t be possible to see anything. Fortunately, I was wrong.”

On the other hand, in the eye there are a lot of intermediaries between what absorbs photon energy (i.e. retinal cells) and what introduces the image in our brain. Photon absorption in itself does not guarantee that we see something. A number of proteins must react. However, it turns out that this process called phototransduction does take place.

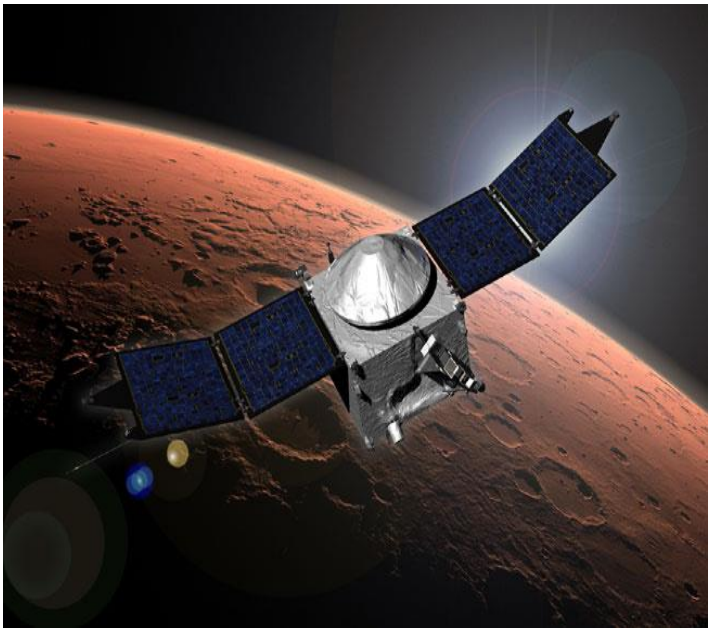
And what can it be useful for? For instance, to check if the eye breaks down. With age or at the outset of a disease, say, macular degeneration (AMD), the effect is poorer. Hence the idea for a new generation of machines for microperimetry, i.e. checking whether we see and what we see at various points on the retina. Researchers thought that perhaps thanks to the two-photon effect, the sensitivity of such devices could be improved, or the threshold of infrared light could be measured. “Thanks to AM2M — a company that is a spinout from the Nicolaus Copernicus University in Toruń, we have already started to produce new microperimetry machines,” the professor says with pride. “There are three in the world right now, and the fourth and fifth and sixth in our country.

What speaks in favor of the new discovery and the devices based on it is also that with age, the human eye becomes more and more turbid and disperses light waves more. Meanwhile, the principle of physics says that the longer the wave, the less it disperses. Infrared will therefore allow for a more thorough examination of the fundus also in people with advanced cataracts or vitreous floaters. Scientists hope that thanks to their device we will detect functional retinal changes, mainly AMD earlier on, but also better understand the process of vision. Indeed, these are the goals of the new MAB (International Research Agenda) working to improve the eyesight of older people.

“As part of our MAB we will try to objectify this process, i.e. move from a little subjective perimetry to objective ophthalmoscopy,” the professor advances to the future, “Using holographic optical tomography. We will analyze functional signals on a principle similar as in tympanometry. This will allow us to determine whether the patient sees and what he sees, without feedback from him, even when he is unconscious or unable to communicate, e.g. after a stroke.”

Article by:
K.Namratha, Roll No:178T1A0449

NASA's MAVEN spacecraft detects mysterious dust cloud on Mars



Atmosphere and Volatile Evolution (MAVEN) mission is seen in this undated artist's concept released September 22, 2014. Reuters NASA's Mars Atmosphere and Volatile Evolution (MAVEN) spacecraft has observed mysterious high-altitude dust cloud and aurora that reaches deep into the Martian atmosphere. The presence of the dust at orbital altitudes from 150 km to 300 km above the surface was not predicted earlier. Although the source and composition of the dust are unknown, there is no hazard to MAVEN and other spacecraft orbiting Mars. So far, no indication of its presence has been seen in observations from any of the other MAVEN instruments. Possible sources for the observed dust include dust wafted up from the atmosphere; dust coming from Phobos and Deimos, the two moons of Mars; dust moving in the solar wind away from the sun; or debris orbiting the sun from comets. However, no known process on Mars can explain the appearance of dust in the observed locations from any of these sources.
Earlier, MAVEN's Imaging Ultraviolet Spectrograph (IUVS) observed what scientists have named "Christmas lights". "What is especially surprising about the aurora we saw is how deep in the atmosphere it occurs - much deeper than at Earth or elsewhere on Mars," added Arnaud Stiepen from the University of Colorado. The source of the energetic particles appears to be the sun. Billions of years ago, Mars lost a global protective magnetic field like Earth has, so solar particles can directly strike the atmosphere. The electrons producing the aurora have about 100 times more energy than you get from a spark of house current, so they can penetrate deeply in the atmosphere. The findings were presented at the 46th Lunar and Planetary Science Conference in the Woodlands, Texas recently.

Article by:
K.V.S.Sravani, Roll No:178T1A0438

DHANEKULA INSTITUTE OF ENGINEERING & TECHNOLOGY

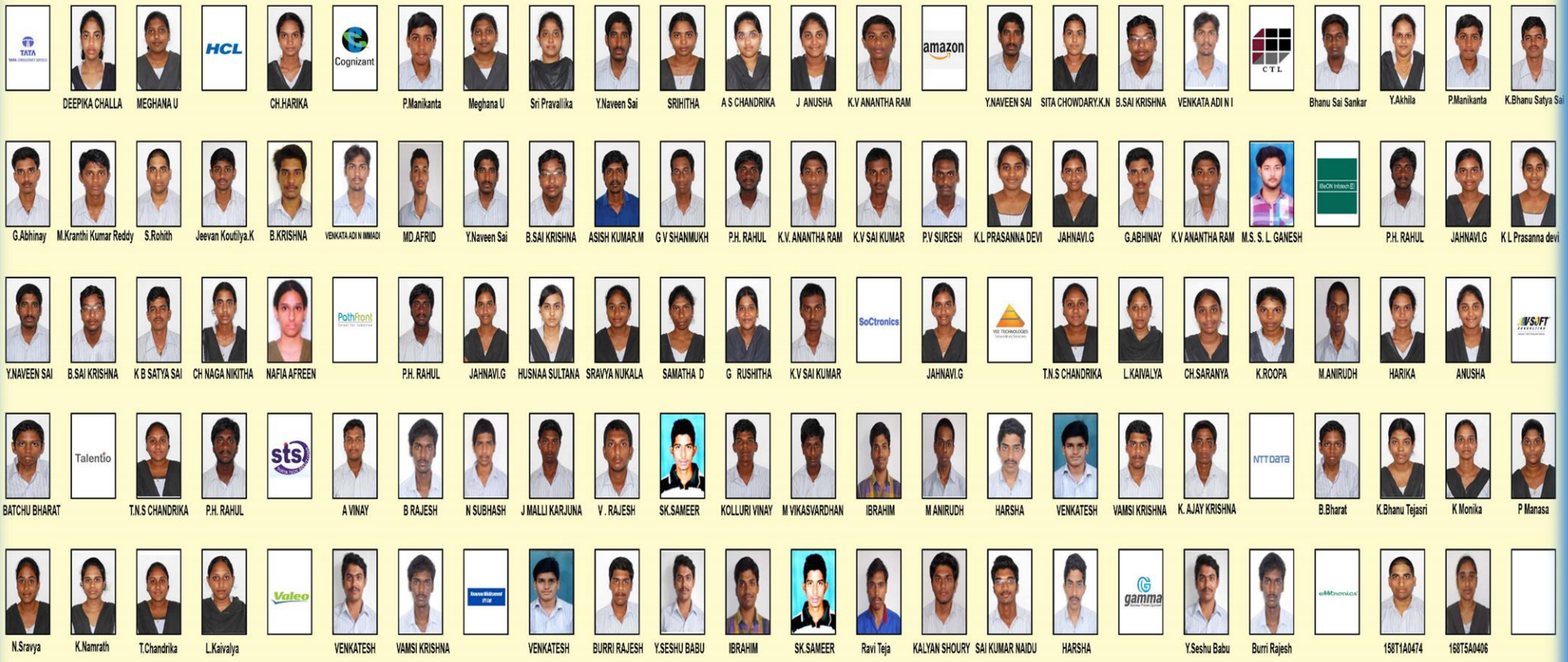
GANGURU, VIJAYAWADA – 521139

An ISO 9001-2015 Certified Institution & Accredited with NAAC & NBA

DEPARTMENT OF ECE

TRAINING, PLACEMENT & CAREER GUIDANCE CELL

WORDS REALLY FAIL TO EXPRESS OUR JOY AT THE NEWS OF YOUR SELECTION FOR THE REPUTED ORGANISATIONS RANGING FROM NATIONAL REPUTATION AND INTERNATIONAL RECOGNITION. YOUR SELECTION WAS HOWEVER, NO SURPRISE BECAUSE YOUNG AND TALENTED TECHNOCRATS OF YOUR CALIBER AND SUPERIOR INTELLIGENCE WERE BOUND TO FARE EXCELLENTLY.



DHANEKULA INSTITUTE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Contact Address

Penamaluru Mandal,
Ganguru, Vijayawada - 521 139

Office
8333924842,8333924843,9441675588

Diplomo: 8333924844

Exam Section: 9121214637

diet2009@rediffmail.com

principal@diet.ac.in

Editorial and Design team:

Faculty: Mr.S.ChandraSekhar

Student Coordinators: 1. G.U.Maheswara Reddy 2. G.Nagaraju