

ELECTRONIKA

DEPARTMENT OF ECE, SILIGURI INSTITUTE OF TECHNOLOGY

Special Points of Interest:

- *Inaugural edition of the newsletter*
- *Recent developments in Nanoscience and Nanotechnology*
- *Achievements and recent publications by members of the department*

ABOUT THE DEPARTMENT

The Department of Electronics and Communication Engineering (started in the year 1999) is one of the oldest departments of the Siliguri Institute of Technology, with Prof. (Dr.) Gautam Das currently being at the helm of the affairs. Under his valuable guidance, the department has been excelling in manifold aspects of academic as well as extra co-curricular activities. The department has its core strength in the field of Electronics, Communication, Signal Processing and VLSI. It is endowed with highly qualified and vastly experienced faculty members including the technical assistants. The departmental laboratories provide state-of-the-art infrastructure for the

budding engineers, which is aimed at making them competent enough not only to provide a practical approach to the theoretical concepts, but also to stay at par with modern day technology and meet contemporary industrial demands. The students are encouraged to indulge themselves in various research activities supervised by the department faculty members. All these factors culminate in the all-round development of the pupils, who after passing out are either placed in leading industries or pursue higher studies at various reputed institutes across India and abroad. The strength of the students belong-

ing to the department is their excellent technical skills augmented by their steadfast motivation to excel in core technical areas – which is quite evident in the form of eminent alumni spread across the globe.



RECENT DEVELOPMENTS

- *UC physicists control luminescence of semiconductor nanowires using gold coating*
- *Validation of heat transport at the nano-scale*
- *Microbiologists help advance development of 'Green' Electronics using microbial nanowires*
- *Researchers capture real-time dynamic visualizations of atoms to build better batteries*

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VISION & MISSION OF ECE DEPARTMENT, SIT

VISION :

To become a nationally recognized center of excellence that produces skilled, innovative and ethical engineers relevant for academics and industry.

MISSION :

1. To offer qualitative Electronics & Communication engineering education and professional ethics of global standards through innovative methods of teaching and learning with practical orientation so as to prepare students for successful career / higher study.
2. Foster culture of innovation and research in

the field of Electronics & Communication engineering.

3. To provide best learning environment to the students, faculty and staff members conducive for creating excellence in technical education.



FROM THE DESK OF THE DIRECTOR



Prof. (Dr.) Jyotirmoy Jhampati

It is a great pleasure for me to know that the Electronics & Communication Engineering Department of the Institute launched its News letter “ELECTRONIKA” to explore the activities of the department.

I do hope this will cultivate and inspire all the students and education lovers curious about the activities of the department.

This will also culminate a ray of thought for their progressive career.

I wish its colourful propagation all through.

—Prof. (Dr.) Jyotirmoy Jhampati,
“Banga Ratna”
B.E. (1st Class 1st), Ph.D. (Engg.),
M.I.E.E. (UK), C.Engg.(I), F.I.E.(I)
Director,
Siliguri Institute of Technology.

FROM THE DESK OF THE HOD

It gives me immense pleasure to note that the “ELECTRONIKA”, the news letter of the department is ready for launch.

The big theme today is to focus on creativity and innovation alongside academics. The news letter is the best platform to showcase the innovations, achievements & thoughts of the students, faculty & staff of the department.

This news letter should be a good source of guidance for faculty and students in choosing activities of their choice in their future for building their

careers.

I appreciate the efforts of the editorial team who have done an excellent job in compiling departmental activities over the year and disseminate them through this news letter.

—Dr. Gautam Das,
HOD,
Department of ECE.
Email : gdas321@yahoo.co.in



Dr. Gautam Das

STUDENT ARTICLE : A QUANTITATIVE APPROACH TO SOLAR ENERGY

The nomenclature has evidently changed since the time when commercializable solar cells appeared on the scene. Conversion efficiency rates of 6% are

roof of a house, could supply enough current to operate all the lights, stove, refrigerator, and other appliances in the house - 24 hours a day." The universe's greatest source of potential power - even greater than the atom - has been harnessed. A solar battery, the first successful device to convert useful amounts of the sun's energy directly and efficiently into electricity, has been demonstrated by the Bell Telephone Laboratories. With an amazingly simple -

looking apparatus made of strips of silicon, the scientists demonstrated how the sun's rays could be used to power the transmission of voices over telephone wires, thanks to its excellent electronic stability at higher temperatures. These strips are extremely sensitive to light. *Linked together electrically, they can deliver power at a rate of 50 W/square yard. It is possible to achieve 6% efficiency in converting sunlight directly into electric-*

ity in contrast with other photoelectric devices, which have never been rated higher than about 1% . Although the sun supplies over a thousand trillion kilowatt hours of energy daily-comparable with all the reserves of fossil fuel and other resources found on earth, man has never been able to convert more than a small fraction of this energy directly to his use.

—**Sweta Mitra,**
3rd year.

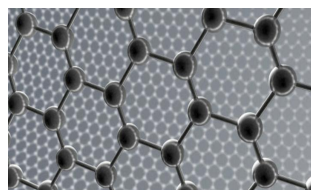


her-alded, enough they say so that"...a wafer-thin slab of crystal, 4 ft. x 15 ft., either resting on or built into the

STUDENT ARTICLE : LIQUID METAL NANOPRINTING

Two-dimensional (2D) semiconductors made of materials such as transition metal dichalcogenides (TMDs) are forming the future of electronic devices. For these applications, 2D semiconductors provide the electronic and photonic properties that are of significant importance in determining the performance capability of certain transistors and lasers, two of the many electronic prod-

ucts currently utilizing this technology. To create such devices, a 2D sheet is formed onto a substrate through several different mechanisms including the exfoliation of



flakes from a layered bulk source, as well as atomic layer and chemical vapor deposition. However, these techniques are limited only to small-scale production needs.

With an average temperature requirement of above 550°C to deposit the material onto the substrate, a process that requires many hours to conduct, cost and practicality of

the production of these devices are also important parameters to consider.

Until now, no current technologies have been capable of creating atomically thin semiconductors with a large surface area; the factor that plays a significant role in determining the power potential of the device .

—**Amit Sharma,**
2nd year.

STUDENT ARTICLE : MAKING A DIODE OUT OF DNA

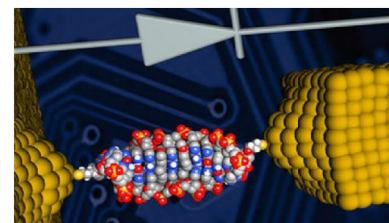
Researchers at University of Georgia have shrunk down one of the fundamental components in electronics, creating the world's smallest diode out of a single DNA molecule. Lead researcher Bingqian Xu said, "Our discovery can lead to progress in the design and construction of nanoscale electronic elements that are at least 1000 times smaller than current components."

Following the line of thought that single molecules are the smallest imaginable stable structure, the team figured DNA would be the perfect candidate, for its predictable structure and programmability.

Interestingly, the problem of reverse leakage current in diode was

significantly overcome

by adding a molecule called coralyne to into a DNA helix (11 base pairs long) and connecting the whole thing to a nano-electronic circuit. Surprisingly the DNA turned out to perform well, with 15 times more conductivity for



negative voltages than for positive ones.

"This finding is quite counter-intuitive because the molecular structure is seemingly symmetrical after coralyne intercalation", said Xu. The research has been published in

ALUMNI COLUMN : INTEL EDISON

In every IoT or robotics project, we have a controller that is the brain of the entire system. Similarly we have Intel Edison. The Intel Edison computing module comes in two different packages. One of which is a mini breakout board the other of which is an Arduino Compatible board. One can use the board in its native state as well but in that case the person has to fabricate his/hers own expansion board. The Edison is basically a size of a SD card. Due to its tiny size, it's perfect for wearable devices. However it's capabilities makes it suitable for Internet of things application and above all, the powerful processing capability makes it suitable for robotics application. However we don't simply use the device in this state.

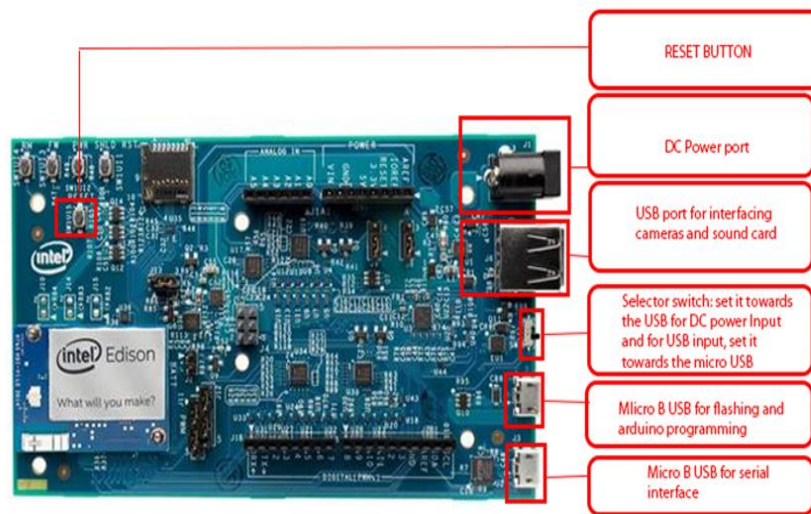
We hook up the board with an expansion board. The expansion board provides the user with enough flexibility and compatibility for interfacing with other units. The Edison has an operating system that is running the entire system. It runs an embedded Linux image. Thus, to setup your device, you initially need to configure your device both at the hardware and at software level. The Intel Edison can be programmed in C,C++, Python, Node.js and Arduino processor language. The possibilities of using the Intel Edison is great and the languages it supports provides more flexibility.

Some sample projects that can be

developed are :

1. All robotics advanced projects where image processing is required
2. Security systems using face recognition and Microsoft Oxford API
3. Wearables for tracking human vitals
4. Smart homes
5. Drones and UAVs

—**Avirup Basu,**
Associate Developer,
Altimetrik (Batch of 2016)



ANNOUNCEMENTS

1. The department is going to form Robotics club which will be concerned with all kinds of activities, viz., seminars, workshops, conferences, etc. related to robotics and automation. Interested participants are asked to contact with Mr. Sourav Sarkar(Assistant Professor, Department of ECE) and Arpan Sarkar (3rd year).
2. The department is going to publish the next edition of the wall magazine. The students are encouraged to submit relevant articles, materials, pictures, poems, etc. For further queries, contact Jayantika Mitra(3rd year) and Anasuya Bhattacharjee(3rd year).

GUEST COLUMN : ANTENNAS IN ASTRONOMY

An antenna is a device used to convert radio waves to electrical signal and vice versa. Hence, antennas are applicable only to Radio Astronomy, which deals with studying radio signals from space. Radio telescopes usually have a huge concave dish, which acts like a mirror and focuses all the radio signals from space onto the antennas at the centre of the dish. Based on this radio signal as input, the antennas then produce electrical signals which astronomers study to discover all the exciting phenomenon going on in distant galaxies. Scientists can see things like: fierce sharp jets of hot material being shot out into the universe from cores of galaxies like fountains, gal-



axies having collided with nearby ones in the past and left a trail of gas in the process, and much more, all thanks to radio astronomy! Astronomers have found several new classes of objects, e.g. quasars, pulsars and masers, all of which emit radio signals. The Big Bang was established as a valid theory by discovering the cosmic microwave background radiation from space, which was detected using radio antennas. Radio waves are electromag-

netic waves, just like ordinary light, except that they are invisible to human eye. So we would not be able to “see” radio waves through a conventional optical telescope; hence the dish-antenna arrangement! Interestingly, since radio waves have large wavelengths, the antennas are unaffected by all external physical factors including sunlight. So, antennas can carry out radio observations incessantly, even during bad weather! Thus, antennas are at the heart of radio astronomy, without which this branch would not even exist, and we would never have been able to know how galaxies dance in space!

—**Ayan Acharyya,**
Mount Stromlo Observatory,
Canberra, Australia.

GUEST COLUMN : IMPACT OF NANOTECHNOLOGY & MOORE’S LAW

The word “Nano” is not new to us anymore. We all know that nanomaterials are materials having dimension 1 to 100 nm at least along one direction. It can be noted that the nano materials get more active compared to its’ bulk form because of its increased surface area and change in density of states. The technology based on nano materials started with the famous quote of Nobel laureate scientist Richard P. Feynman in the year of 1959 that was published in 1960 entitled “there is plenty of room at the bottom”. If Feynman was the philosopher of this new field then Eric Drexler should be considered as the guide to steer this new technology predicting unlimited scope of nanotechnology for developing molecular nanodevices. Gordon Moore, the founder of Intel, in the year of 1965 predicted, that the number of transistor per circuit would double every year through the decade follow that year. However in general he himself described the law as “*Moore’s law has been the name given to everything that change exponentially*”. His prediction has proven to be uncannily accurate, in part and the law is now used in the semiconductor industry to guide long-term planning and to set targets for research and development.

“There is plenty of room at the bottom”
- **Richard Feynman(1960)**



Three pioneer workers in nanotechnology : (a) Richard Feynman (b) Eric Drexler, (c) Gordon Moore

The growth of nanotechnology patenting in the fields of electronics, chemicals and instruments is the most while sub-fields with above-average growth rates include machines and tools, materials and metallurgy, materials processing, information technology and semiconductors. Nanotechnology is enabling diversification beyond fields of previous specialization into the application fields of instruments, chemicals, pharmaceuticals and biotechnologies.

Nanotechnology has found its applications in numerous fields each of which can be a topic of several big fat books here just few names are mentioned that includes: nanocosmetics, textiles, sensors, drug delivery, cancer therapy, tissue engineering, water purifications, lab-on-a-chip, display, lighting, computers, dip pen lithography, MRI with magnetic nanoparticles, porous materials.

—**Dr. Diptonil Banerjee,**

M.N. Dastur School of Materials Science Engineering,
IEST, Shibpur (Howrah)

RECENT ACHIEVEMENTS OF STUDENTS

- Debabrata Banerjee of 4th year won the hardware project competition in Technovision 2K17.
- Swapnil Pradhan of 3rd year and Pragyanka Pradhan of 2nd year secured the runner-up position in hardware project competition in Technovision 2K17.
- Ankita Saha, Kajal Kumari and Saransh Choudhary of

3rd year were awarded the Devang Mehta Excellence Awards for distinguished academic performances, presented by NASSCOM in September '16.

- Jayantika Mitra of 3rd year stood the champion and runner-up in Fashion Show and Dance events respectively organized by IILS Siliguri in June '16



Debabrata Banerjee

ACHIEVEMENTS OF ALUMNI

Following is a list of alumni placed in top-notch industries in the year 2016 :

NAME OF THE PLACED STUDENTS	NAME OF THE COMPANY
AMALENDU PAUL	TIRUMALA
AMAN SHAW	ROBERT BOSCH
AMIT KUMAR	SYSTROM
ANANDA SHANKAR BAGCHI	ZENPACT/ZOMATO
ANTARA BANERJEE	ALTEMETRIC
AVINASH KUMAR	SYSTROM
AVIRUP BASU	ALTEMETRIC
BIBEK RAUTH	TCS
DEBAJYOTI SARKAR	TCS
DIBYO GHOSH CHOWDHURY	ALTEMETRIC
DRAVID KUMAR	SYSTROM
JAYA BISWAS	TATA COMMUNICATION
JOYDEEP MAJI	TCS
KHALIDA TABASSUM	TCS
KRISHNA KUMAR JHA	TCS
MILAN MAHADANI	JEOL INDIA PVT. LTD.
NEHA PANKAJ	AMAZON
PRITAM SINGHA ROY	SYSTROM
NIVEDITA MISHRA	TCS
PIYUSH BENIA	TATA COMMUNICATION
PRIYA DEB ROY	TCS
RAHUL KUMAR SINGH	EMERSON
PROMIT ROY	TIRUMALA/VEDIOCON D2H

NAME OF THE PLACED STUDENTS	NAME OF THE COMPANY
RAVI SHANKAR	SYSTROM
RIMA DAS	TCS
RITIKA SAHA	TCS/ALTEMETRIC
ROSHAN KUMAR GUPTA	TIRUMALA/TECH MAHINDRA/SRIRAM
SANDIPAN BANERJEE	TLC/SRIRAM
SHOURYADEEP SANYAL	TCS
SHREYA CHANDRA	TATA COMMUNICATION
SMITHODHY RUDRA	VEDIOCON D2H
SMRITIKANA ROY	TIRUMALA
SOUBHIK PAL	TLC/DATA64
SOUMI GHOSH	TCS/ALTEMETRIC
SRAMANA TALUKDAR	TATA COMMUNICATION
SUBHADIP MUKHERJEE	TLC/ZOMATO/CGI/TECH MAHINDRA
SUDESHNA CHATTERJEE	ROBERT BOSCH
SULAGNA PRAMANICK	Tech Mahindra
SUMAN DHAR	TCS
SUNANDO DEBNATH	TLC
TRINALEENA KUNDU	SYSTROM
VISHANT PRASAD SHARMA	ROBERT BOSCH
WATAN AGARWAL	TCS
MRINMAY DAS	WIPRO
SOUMASREE SARKAR	Deto ex IT sector
SUCHANDA ROY	TATA COMMUNICATION

ACHIEVEMENTS OF FACULTY

Dr. Subhojit Sarker (Assistant Professor, Department of ECE) was awarded PhD degree from Jadavpur University, Kolkata for his work on “Application of Non-Linear techniques in the Analysis of Heart Rate Variability (HRV)” in August '15.



Dr. Subhojit Sarker

RECENT PUBLICATIONS

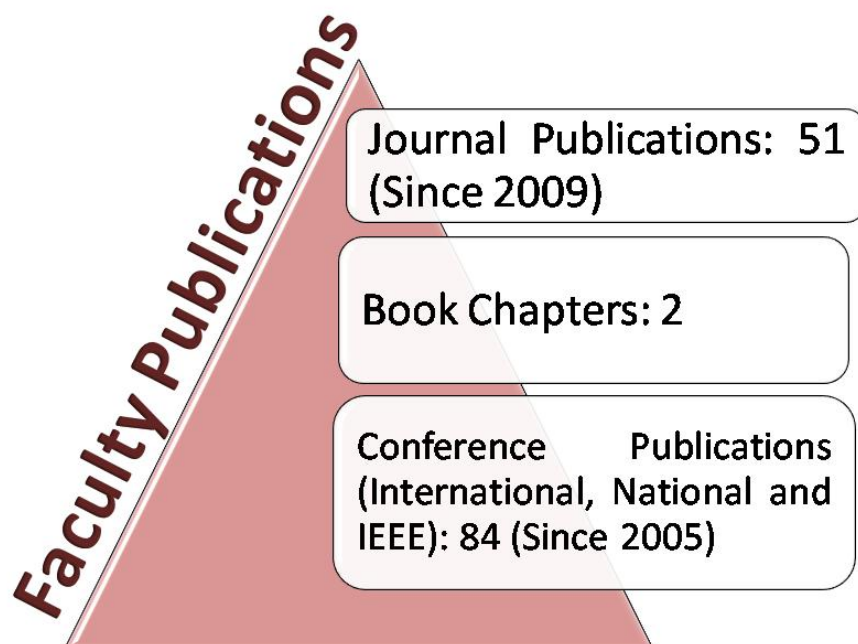
It has been a zeal of the department of ECE to instil among its pupils, faculty and students alike, a strong interest to get involved in various research works, of which the following publications are testimonials:

PUBLICATIONS IN PEER REVIEWED JOURNALS BY FACULTY MEMBERS OF ECE DEPT. (2016-17) :

1. Sourav Sarkar, Diptonil Banerjee, U. K. Ghorai, N.S. Das and K. K. Chattopadhyay, *Size Dependent Photoluminescence Property of Hydrothermally Synthesized Crystalline Carbon Quantum Dots*, Journal of Luminescence (Elsevier) 178 (2016) pp-314-23.
2. Dia Ghosh, Arindum Mukherjee, Somnath Chatterjee, Baidya Nath Biswas, *A comprehensive theoretical study of Dual loop optoelectronic oscillator*, Optik, Elsevier, Vol.127 (2016) pp-3337-3342.
3. Dia Ghosh, Arindum Mukherjee, Baidyanath Biswas, *On the effect of combining an external Synchronizing signal Feeding the Mach-Zehnder modulator In an optoelectronic oscillator*, Optik, Elsevier, Vol.127 (2016), pp-3576-3581.
4. Dheeraj Kumar, Diptonil Banerjee, Sourav. Sarkar, Nirmalya S. Das and Kalyan K. Chattopadhyay, *Easy synthesis of porous carbon mesospheres and its functionalization with Titania nanoparticles for enhanced field emission and photocatalytic activity*, Materials Chemistry and Physics (Elsevier) 175 (2016) pp-22-32.
5. Anindita Sinha, Tania Bhowmick, Saugata Sinha, *Practical Approach of Producing Delta Modulator and Demodulator Circuit*, IOSR-JECE, ISSN: 2278-8735. Volume 11, Issue 3, Ver. II (May-Jun .2016).
6. A.Mukherjee, D.Ghosh, N.R. Das, B.N. Biswas, *Harmonic distortion and power relations In a single loop optoelectronic oscillator*, Optik, Elsevier, Vol.127 (2016), pp-973-980.

PUBLICATIONS OF STUDENTS FROM FINAL YEAR PROJECT (2016-17) :

1. Proteem Ganguly, Shalini Dey, Sayani Nandy, Avirup Basu, Sourav Sarkar, *"The Third Eye"*, 1st International Conference on VLSI devices, Circuits and Systems 2016, American Scientific Publisher (ASP), Advances in Industrial Engineering And Management, ISSN:2222-7059 (Print); EISSN: 2222-7067 (Online).
2. Avirup Basu, Sudip Ghosh, Sourav Sarkar, *"Autonomous navigation and 2D mapping using SONAR"*, WECON-2016, Chitkara University, Rajasthan (Paper will be included in IEEE Explore).



We would like to learn from our readers as well. You can send your valuable suggestions at the following :

Phone: +91993332948

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Email: sitelectronics900@gmail.com



FROM THE STUDENT EDITOR'S DESK

It gives us immense pleasure to announce the publication of the inaugural edition of the departmental newsletter on such an auspicious occasion. The work for the publication started back in late February and thanks to the relentless efforts of the entire team, the project has been materialized within such a short span of time. We are highly indebted to faculty and staff members who guided us throughout the process, starting from the contents as well as making crucial edits and additions to the newsletter. We also thank respected Director Sir, HOD Sir as well as the entire department for consistently encouraging us and giving us a chance to put forward our ideas. Finally, kudos to the team without which this task seemed insurmountable. We hope that our work will generate the interest of everyone in this field of engineering and we will put our best efforts for further improvements.

Also, in the coming months, manifold activities have been planned as a part of which we are going to publish the next issue of wall magazine.

Saransh Choudhary,
Student Editor
ELECTRONIKA.

FROM THE EDITOR'S DESK

We are happy to announce that ECE Department is going to publish its newsletter titled "ELECTRONIKA". We believe that no matter whether a magazine is delivered to our doorstep or to our Laptop, printed on paper, appearing on our iPad or our cell-phone screen, it is still and foremost the work of an editorial team to package meaningful ideas, words, information and images for its readers. We hope that we will be successful in publishing articles of different flavor through "ELECTRONIKA" in coming months.

As an Editor, I want to thank the Honourable Director Sir, HOD Sir, College administration, our editorial team, Techno India Group and our writers for helping us to publish this issue of our newsletter.

We, the editorial team, will always try to keep our readers engaged. So, please feel free to send your feedback and suggestions to sitelectronics900@gmail.com and souravsarkars@gmail.com.

Sourav Sarkar,
Editor, Email: souravsarkars@gmail.com
ELECTRONIKA.

MEMBERS OF COMMITTEE :

Mr. Manas Saha (Asst. Professor, Department of ECE, SIT)
Mr. Sourav Sarkar (Asst. Professor, Department of ECE, SIT)
Mr. Sudip Ghosh (Asst. Professor, Department of ECE, SIT)
Saransh Choudhary (3rd Year)
Kajal Kumari (3rd Year)
Poulami Ghosh (2nd Year)
Ozowita Roy Deb (2nd Year)
Sudeshna Saha (1st Year)
Nilanjan Deb (1st Year)

