



ECE CURRENT

Newsletter

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Content:

✧ Word of mouth

✧ Campus buzz

✧ Publications

✧ Opportunities

✧ Recent Innovations

✧ ECE snapshot



An initiation by IIITD

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Sanchit Agarwal
Year: (2012- 2016)

Word of Mouth- Student Interview

Sanchit Agarwal is a fourth year student pursuing Bachelors in Electronics & Communication Engineering from Indraprastha Institute of Information Technology-Delhi. He has a strong affinity towards using his engineering skills to solve common problems concerning humans. He is an avid fan of Elon Musk and belives one day he would be able to print whatever he thinks instantly! He is currently placed at Grey Orange Robotics. Software defined radio's and 3D-Printers are something you can find him playing with in his leisure time So, here we bring to you his post-placement interview.

- **How has this Journey been for me?**
 - It's been a roller coaster ride! I have made some really good friends, people here have been very supportive. The faculty here has been very encouraging. Administration is classy.
 - The best part has been the hostel life, everything has resolved within 24 hrs!
- **What are your highlights and lowlights?**
 - Highlights : Friends! Aman, Abhinav and Prafful and few more who would not want their names here!
 - Low points : There have been many, everyone does have a few. When I feel low my father always says this thing to me “Agar baacha girega nahi toh chalna kaise seekhega”. (If you do not fall, how will you learn to walk) :P
 - Plans for future : I don't really know. I want to work for development of low cost health care.
- **Any advice for juniors ?**
 - My motto has always been to reason. If I am not being able to apply what I am learning to the real life then it's of no use to me. I have met people who have been in worse scenarios than ours but the only thing that set them apart was their ability to implement something that brought a change in the real environment. I am very inspired by people like Arvind Gupta, Rajesh Kumar Sharma, Prakash Amte and many others.

Campus Buzz

Seminars/Workshops/Contests:-

Workshops:-

- 5 day course on Advanced RF Design sponsored by Keysight Technologies (22nd - 26th July 2015).
- Power Supply Training and Webinar from TI and Biricha, Friday, July 17th.
- One Day Workshop on Network-on-Chip March 29, 2015 (Sunday) at IIIT Delhi.

Seminars:-

- Mr. Raj Kumar Nagpal from Synopsys / STMicroelectronics delivered a talk titled "Jitter understanding and Jitter failure investigation for High Speed Parallel (DDR) memory links" on 16th april 2015.
- Seminar on 19th March 2015. Dr. Vishwesh Guttal from IISc Bangalore will be delivering a talk titled "Early warning signals of tipping points" on 19th march 2015.
- Special talk by Prof. Dipankar Nagchoudhury on 18th February 2015 (Wednesday). The talk is titled "Logical Effort - A Model for Delay Estimation".
- Talk from Prof. Anurag Kumar on 27th January 2015. Title: Design and Deployment of IEEE 802.15.4 ("Zigbee") Networks for Internet of Things Applications.

Contest:-

- Texas Instruments India Analog Maker Competition 2014(one week (03/Nov/14 to 09/Nov/14)).

Hardware Hackathon (Theme: Internet of Things) held in Research Showcase'15:

A new event has been introduced this year for the undergraduate/graduate students to show their hardware design talent to imminent jury comprising of industry specialists and academicians. Participants are encouraged to form groups of 3-4 students to boost their skills and also meet fellow students who love building things. Few interesting categories participants will be judged on include fastest prototypable project,most fun project and the viewers choice. Whats more than most is that could land an internship at a core ece company for winning the jury round!

Below were few of the listed ideas:

1. Indoor Localization Challenge
2. Two wheel self balancing robot
3. Sound Localization
4. Gesture based Security System
5. Vehicle Tracking using cameras installed on the roads
6. Surveillance system using PIR sensor and camera

The competition saw a huge enthusiasm and participation from IIITD students, and students from other colleges as well. The event overall, was a huge success.

Some of the publications from the dept. of ECE are listed below:

- Wazir Singh, G. Anil Kumar, "Design of 6T, 5T and 4T SRAM Cell on Various Performance Metrics", 2nd IEEE International Conference on Computing for Sustainable Global Development (INDIACom), 2015, New Delhi, India, pp. 899-904, March 2015.
- Anil Kumar Gundu, Wazir Singh, Sai Manoj Divi, "A Proposed Low-offset Sense Amplifier for SRAM Applications," 2 nd IEEE International Conference on Signal Processing and Integrated Networks (SPIN), Noida, India, pp. 964-967, Feb. 2015.
- Gade, Sri Harsha, Hemanta Kumar Mondal, and Sujay Deb. "A Hardware and Thermal Analysis of DVFS in a Multi-core System with Hybrid WNoC Architecture." IEEE 28th International Conference on VLSI Design (VLSID), 2015 .
- Priya Aggarwal, Anubha Gupta, and Vivek Ashok Bohara, "A Guard Interval Assisted OFDM Symbol-Based Channel Estimation for Rapid Time-Varying Scenarios in IEEE 802.11p," IEEE 26th Annual International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC), Sept. 2015 (Accepted).
- Priya Aggarwal, Anubha Gupta and Ajay Garg, "Joint estimation of hemodynamic response function and voxel activation in functional MRI data", 18th International conf. on Medical Image Computing and Computer Assisted Interventions (MICCAI), Oct. 2015(Accepted).
- Naushad Ansari, Anubha Gupta, "Lifting-based Rational Wavelet Design from a Given Signal", IEEE International Conference on Digital Signal Processing, July 21-24, 2015, Singapore (Accepted).
- Naushad Ansari, Anubha Gupta, "Signal-Matched Wavelet Design via Lifting using Optimization Techniques", IEEE International Conference on Digital Signal Processing, July 21-24, 2015, Singapore (Accepted).
- Anupriya Gogna, Sri Harsha Gade, Anubha Gupta, "Design of Signal-Matched Critically Sampled FIR Rational Filterbank", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2015, April 19– 24, 2015, Australia.
- Ananya Sen Gupta, Naushad Ansari, and Anubha Gupta, "Tracking the underwater acoustic channel using two-dimensional frequency sampling", IEEE OES International Symposium on Underwater Technology 2015, National Institute of Ocean Technology-India, Feb 23-25, 2015, Chennai, India.
- Chandan Pradhan and Anubha Gupta, "Modeling of Ambient and Ship Noise in Underwater Ocean Environment of the Bay of Bengal", Accepted, IEEE International Conference on Signal Processing, Informatics Communication and Energy Systems (IEEE SPICES 2015), Feb. 19-21, 2015, National Institute of Technology Calicut (NITC), India.
- A Deterministic, Minimal Routing Algorithm for a Toroidal, Rectangular Honeycomb Topology Using a 2-tupled Relative Address 28th IEEE International System-On-Chip Conference (SOCC) 2015 Alexander Fell, Ranjani Narayan, S. K. Nandy.
- A 6T SRAM Cell Based Pipelined 2R/1W Memory Design Using 28nm UTBB-FDSOI 28th IEEE International System-On-Chip Conference (SOCC) 2015 Ramandeep Kaur, Harsh Rawat and Alexander Fell.
- Floorplan and Congestion Aware Framework for Optimal SRAM Selection for Memory Subsystems 28th IEEE International System-On-Chip Conference (SOCC) 2015 Gaurav Narang, Prakhar Raj Gupta, Alexander Fell and Anuj Grover.

Internships:

Several internships were rolled out this summer.

Some of them being:

- Next Generation Passive Optical Networks
 - Mentor: Dr. Anand Srivastava
- Virtual Electronics Lab
 - Mentor: Dr. Mohammad Hashmi
- Mixed Signal Electronics
 - Mentor: Dr. Mohammad Hashmi
- Traffic Karma
 - Mentor: Dr. Pravesh
- Wireless Networks Optimization
 - Mentor: Dr. Sanjit Kaul
- Multimedia Forgery Detection
 - Mentor: Dr. A V Subramanyam
- Radar Imaging
 - Mentor: Dr. Shobha Sundar Ram
- Dynamic spectrum learning, tunable bandwidth access and RF energy harvesting in Cognitive Radio Networks
 - Mentor: Dr. Sumit J Darak
- Cognitive Radio
 - Mentor: Dr. Vivek

Projects:

1. Fault-resistant network bots

By Abhishek Kumar, Aman Singhal, Prafful Bansal and Himanshu Singh Dabas, 2012 Batch as their Independent Project

This project is currently being pursued since this winter semester 2015.

They are creating a project which can be used for disaster areas where humans cannot go. System of robots are put into unknown location where only the charging point is known to the robots and they are put into the unknown building and they follow the wall to create the map. All bots collaborate in creating the map and share it with each other. Once the walls are covered, i.e. the map is created, they start covering the floor. Then their network should not break and each device should be connected to at least one device. If one bot loses the network, it should know the last point when he was in the network and go there and connect back, share the network, don't go out of the network and should know map sharing and dividing the work.

2. Wearable Antenna

By Bavneet Singh and Raghav

Done in winter semester 2015 as part of Antenna Theory and Design course. Wearable antennas are patch antennas made out of jeans cloth and copper tape. They focused on keeping the antenna cheap and easy to replicate. They made the antenna for the Bluetooth range and the antenna had a fairly good bandwidth of 150 MHz. We also tried tested for the changes when we bend it or flex it and that too gave pretty stable results. It could be used for multiple purposes such as continuous health monitoring et al.

3. Smart routing for network on chip

By Raghav Sehgal

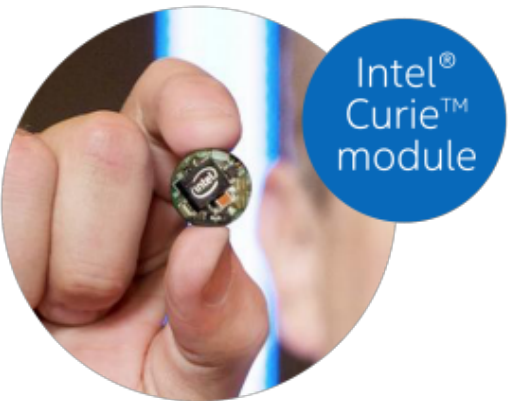
Done in winter semester 2015 With the advent of multi-core processors it is becoming more and more difficult to make the processors communicate. So to do the same the cores are arranged in a grid and the data transmitted using these grids in the form of packets. It is observed that often the metallic lines connecting these grids break or become too congested. In such a case the data packet needs to be self-aware that the forthcoming line is congested or faulty. He worked on algorithms that made the system fault tolerant and congestion aware as a whole.

Recent Innovations in the field of ECE

Intel Curie Module: Unleashing Wearable Device Innovation

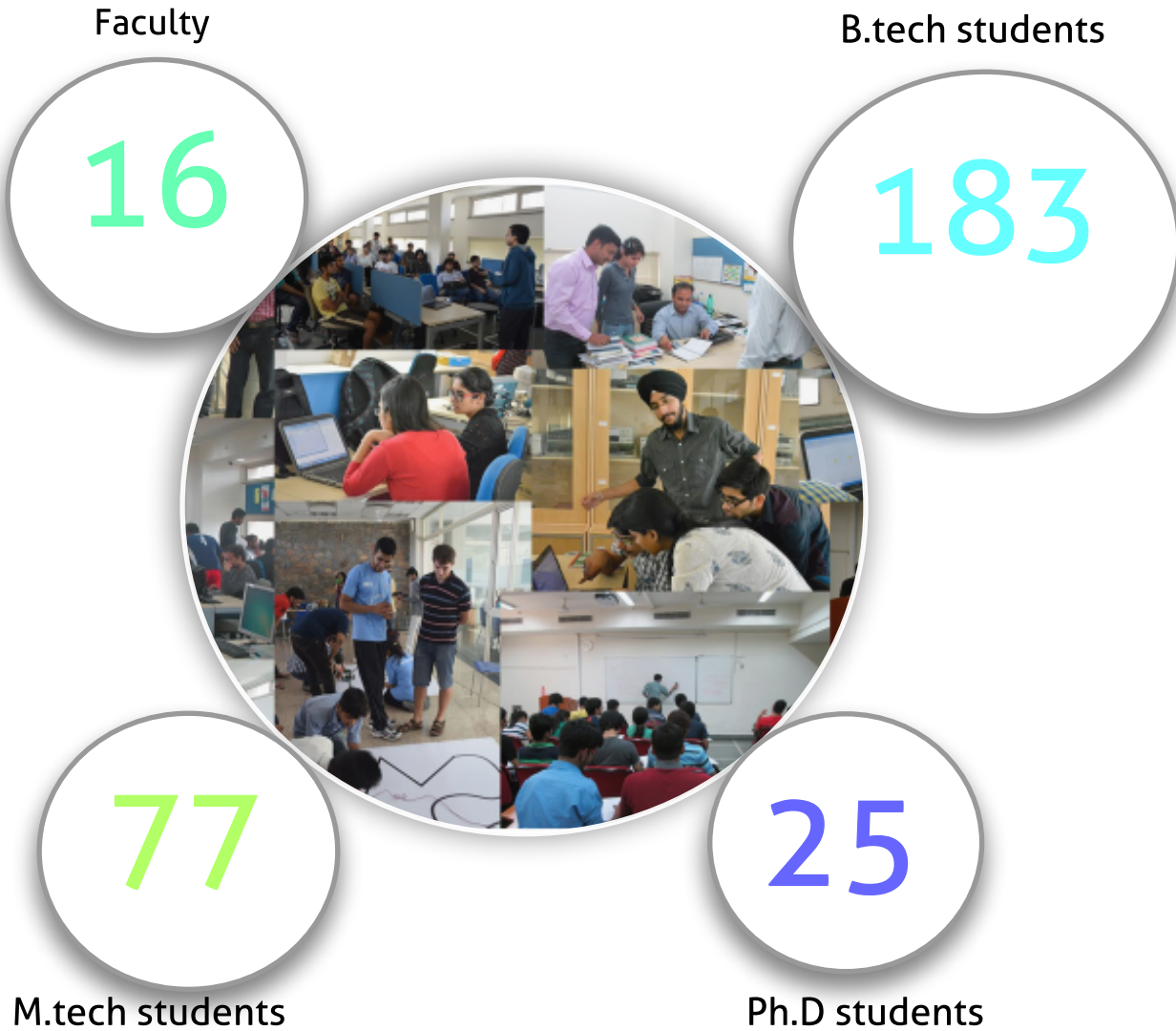
Nowadays, companies like Google, Apple, Samsung and many more, are trying to make wearable technology. While these wearables pose some issues such as high cost, energy inefficiency and a poor battery life, Intel came up with new Curie SOC which will solve the problems with the former problems. Curie is a button sized module which includes 6-axis combo sensor with accelerometer, gyroscope and pedometer (a device that counts each step a per son takes). Key features of this technology are a low-power, 32-bit intel Quark SE SOC, 328 KB Flash memory, 80K B SRAM, a low-power integrated DSP sensor hub and pattern-matching technology, low power bluetooth and a battery charging circuitry.

The wearable technology does not seem to have a standard platform, so, Intel introduced a software solution that has an efficient real-time operating system together with wearable applications called Intel IQ software kits. These kits has an embedded software that runs on this module to make a standard platform with an efficient hardware. These module are not being authorized hence they are not for sale yet



	Intel Curie
CPU	Quark SE @ 7 MHz
RAM	80kB SRAM
WiFi / BT	"BT Low Energy"
Storage	384kB flash
I/O	Battery charging PMIC
OS	Open source Real-Time OS
Dimensions	Approx. US dime (~18mm diameter)
Sensors	Integrated DSP sensor hub with pattern matching 6-axis combo sensor (accelerometer and gyroscope)

ECE snapshot



TEAM

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