ELECTRON wave

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MESSAGE from the Editor

It gives me a lot of pleasure to introduce before you Vol. 03 No. 01 of Electron Wave, the School of Computing and Electrical Engineering (SCEE) Newsletter. Years passed by and the School of Computing and Electrical Engineering has grown significantly. Currently, the school has 34 faculty members in its list. In terms of the areas of research, the school is also quite diversified in its focus ranging from Signal processing and Communication to VLSI, Power Systems to Control Systems, Embedded Systems to Human Computer Interaction. A good number of faculty members from other institutions within and outside India have also visited IIT Mandi for long and short periods contributing to the intellectual growth of the institute. In this volume, we are publishing the interview of Prof. Deepak Khemani, who is visiting IIT Mandi, being on deputation from IIT Madras.

..What's Inside..

Recent Research Activities

Outreach Activity: Technical Laboratory Visits of UG Students

Organized by: SCEE and IEEE
Date: March 26, 2018

"Technology is best when it brings people together"

With this spirit in mind SCEE and IEEE had organized a technical laboratory visit for the undergraduate students of Bachelor of Technology in Electronics and Communication department of Sri Sai University, Palampur, Himachal Pradesh. Since the aforementioned college was devoid of IEEE student branch/chapter, therefore the visit was first initiated with the talk on "The benefits for IEEE membership". The interaction session included interesting topics viz. Introduction of IEEE and its societies and further a brief introduction to IIT Mandi and its ongoing research areas have been familiarized to the students. Volunteers took students to different Electrical laboratories like; Electrical Machines Lab., Electronics & Communication Lab., Digital Electronics Lab., Control Lab., and lastly Special Electrical Machines Lab.

Research fair: Anusandhan

Organized by: Research Council of IIT, Mandi

Date: March 17, 2018

**Event Chief Guest:
Dr. Ramesh Oruganti**

The Research Council of IIT Mandi, a team of nine leading members from different disciplines has organised a day long institute research fair, Anusandhan on Saturday 17th March 2018. This is a wide platform for all the scholars to present their work by means of either poster or oral presentations. Dr. Ramesh Oruganti, Dr. Suman Kalyan Pal and Dr. Venkata Krishnan has inaugurated the session followed by a motivating and informative speech by the event chief guest, Dr. Ramesh Oruganti. A total of 32 oral and 110 poster presentations were given by the research scholars.

Industrial Visit to Powergrid, Haryana

Organized By:
Dr. Bharat Singh Rajpurohit

Date: April 25, 2018

Industry Visit of M.Tech Power Electronics & Drives students to 800 kV HVDC Converter Station, Powergrid India, Kurukshetra, Haryana.

Recent Projects

Title: Detection and Quantification of dicentric chromosomes from captured images for Triage Biodosimetry applications
PI: Dr. Anil Kumar Sao
Co-PI: Dr. Arnav Bhavsar
Funding Authority: INMAS DRDO
Amount sanctioned: INR 8.679 lakhs

Title: Ab initio search of new magnetoelectric materials
PI: Dr. Arti Kashyap
Funding Authority: Nano Mission, DST
Amount sanctioned: INR 57,36,538

Title: Center for innovative technologies for Himalayan region
PI: Dr. Arti Kashyap
Funding Authority: CSTRI, DST
Amount sanctioned: INR 31,40,000

Title: Eco-friendly utilization of Hazardous dry pine needles
PI: Dr. Arti Kashyap
Funding Authority: CSTRI, DST
Amount sanctioned: INR 19,13,000

Title: Magnetic properties and structural transformations in binary Fe-Pb and Fe-Pd-M (Indo- Russian)
PI: Dr. Arti Kashyap
Funding Authority: DST
Amount sanctioned: INR 19,86,400

Title: Development of Low Cost Accelerated Water Purification Systems with Added Mineralisation for Himalayan Region
PI: Dr. Jaspreet Kaur Randhawa, Dr. Bharat Singh Rajpurohit and Dr. Samar Agnihotri
Funding Authority: National Mission on Himalayan Studies
Amount sanctioned: INR 40.66 lakhs

Title: High- Throughput & Energy- Efficient Flexible- Turbo/LDPC Decoder for the Next- Generation Wireless- Communication Systems.
PI: Dr. Rahul Shrestha
Funding Authority: Department of Science and Technology (DST), Govt. of India.
Amount sanctioned: INR 58 lakhs

Title: FarmerZone
PI: Dr. Srikant Srinivasan
Co-PI: Dr. Siddhartha Sarma
Funding Authority: DBT's Indo-UK collaboration
Amount sanctioned: INR 7.5 crores

Faculty Achievements

- ➤ **Dr. Bharat Singh Rajpurohit** was honored by IEEE Industry Application Society (IAS) **Outstanding Chapter Chair Award 2018.**

- ➤ **Dr. Hitesh Shrimali** was honored by **Distinguished Alumni Award 2017**, Nirma University.

- ➤ **Dr. Shubhajit Roy Chowdhury** was selected as **Associate Editor of IEEE Access Journal** by IEEE in the year 2018.

- ➤ **Dr. Shubhajit Roy Chowdhury** was elected as a **member of Award Committee for Gandhian Young Technological Innovation (GYTI) Award** by the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) in the area of Health Care devices in the year 2018.

- ➤ **Dr. Srikant Srinivasan** has been awarded **DBT's Ramalingaswami Re-entry Fellowship.**

Face to Face with Prof. Deepak Khemani

Prof. Deepak Khemani has been doing research in the field of Knowledge Representation & Memory Based Reasoning and Natural Language Processing (NLP). He has authored and co-authored many conference and journal papers and a text book on Artificial Intelligence (AI). He has also shared his knowledge via NPTEL lectures on Artificial Intelligence. He is currently teaching at Indian Institute of Technology, Mandi, where he is on deputation.

1. Who are you and what do you do?

I am a professor in Computer Science and Engineering Department at IIT Madras and visiting professor at IIT Mandi in SCEE. I received all three degrees, B.Tech. (Mech. Eng), M.Tech. and PhD (CS&E), from IIT Bombay and then I was recruited as a faculty at IIT Madras. I had few breaks in between wherein I went to TATA Research Centre (Pune) for one year and also came to IIT Mandi in 2011 on deputation.

2. You have been teaching at IIT Madras and now you are teaching at IIT Mandi. Do you find any difference in the attitude of the students at the two places?

I don't have much interaction with PhD students here, as I have been teaching B.Tech. students. They are the same capability wise and even some of the best students I have taught have been from IIT Mandi. But I feel that the attitude of students here is a bit more relaxed.

3 It has been observed that the attention span of students has considerably decreasing over time and now it is less than 10 minutes. Do you have a fix for this problem?

Ideally, I think IIT Mandi is a perfect place where one could have fewer distractions but unfortunately the Internet takes over everywhere. I have observed that the culture here is to inculcate habit of reading, trekking which are kind of lengthy activities. Also, I think that it is a universal phenomenon and does not really have a fix.

4. You are working in the field of Artificial Intelligence (AI). Do you use AI as an aid to your teaching?

No, we are not using AI as an aid for teaching but over the years we did try to build some tools which can be used for teaching to illustrate and animate algorithms. I have been trying to get it done through students, but we have never been able to complete the package, partly because of lack of desire among the students. Also, these are kind of more generic things, especially since we deal with algorithms in AI and in computer science in general, we could have programs which could illustrate the algorithms by actually executing them and showing them graphically as the progress is happening.

5. How do you see the research on AI to go 10 years down the line?

Computer Science in general is very hard to predict. The Turing Test was proposed by Alan Turing in 1950s. It's a test of whether you can fool people into thinking that they are talking to humans while talking to a machine like a chat-box. In that case, Turing said, one can say that the machine is intelligent. But researchers are still struggling to do that. Of course, Speech Recognition and Natural Language Interaction are better, but it's still not reached to a level where you can convince yourself that the other side is human. Alan Turing predicted that this would happen in next 50 years or so but it still hasn't. So it's very difficult to predict. Basically, AI is a field where there are waves which keep coming. In 70s, it was a fad for expert systems. In 80s, it was a fad for neural networks. In 90s there was another area called case-based reasoning and machine learning. Then again neural networks and deep learning came in. And I am sure we will go to something different because deep neural networks have their imitations, although they are very powerful in many ways especially in classification and pattern recognition. It is not the only tool which you can use in building general purpose AI, which is what you need for building intelligent systems.

6. What are the specific problems in India, which you feel can be solved through AI?

One problem being addressed everywhere in the world using AI, machine learning and pattern recognition in particular, is medical diagnosis. Nowadays, it's feasible to take an image and the program has access to many such images and the associated diagnoses from all over the world. It should be soon possible to take say a retinal image on the mobile phone, and get a diagnosis over the Internet. Practically, an individual doctor can have only a certain amount of experience which he has got through 15-20 years of practice but a program can have access to experiences of all the people, all the programs and machines which are diagnosing. So, in that sense there is one big possibility of advancement in medical domain. Another area where there is not enough progress being made is building educational system. As we have shortage of teachers, especially at school level, building systems to teach how to solve problems would be helpful.

7. Is it possible for a robot to teach a class?

If you use the term robot in very generic sense, I suppose you mean an intelligent program. When we say robots are taking away our jobs, it does not mean that it is a physical robot, it's a program as we call it. So, at the moment I don't think that anywhere near a machine being able to teach a subject. This would require, at the very minimum, more detailed modeling of the domains and the problem solving approaches.

8. Given that IIT Mandi is located far off from the silicon hub of the country, what is your opinion about the prospects of IIT Mandi students to get placed?

I don't see what distance has got to do with placements. In fact, as we discussed earlier, IIT Mandi is a place where one can have more focused studies and do better work and research. As far as placements, I think there is always a demand for good students. It is a common notion here that calling a company or to get the confirmation for recruitment is difficult. Yes, that is a thing which Training Placement Cell should try to sort out. But if you build a reputation of producing good students, then companies will naturally come. Maybe they should try to conduct interviews over Skype, like many students who apply in foreign universities do.

9. Please give your word of advice to the students at IIT Mandi.

Make the most of your time here as much as you can and come up with some great idea for your project/research. You can't study all the time in any case. So, develop at least one strong hobby here to have something to keep you occupied after long hours of study.

Publications

- Journals: 31
- Conferences: 51
- Books and Book Chapters: 2
- Patent Filed: 1

Student Achievements

- Mrs. Avantika Singh, Ph.D. student under Dr. Aditya Nigam got her research work accepted for the presentation in WiCV@CVPR2018 at Utah USA and have got full funding.

- Rohan Aggrawal, Manish Sharma, Shubham Kumar Tiwari (B.Tech (EE) 2nd year), Akul Gupta (B.Tech (CS) 2nd year), Vikas kumar(B.Tech (ME) 2nd year), Gaurav Meena (B.Tech (CE) 2nd year)-were awarded Frugal Innovation Award for Design Practicum project on Low Cost All Seasons' Jacket under the supervision of Dr. Shubhajit Roy Chowdhury.

- Mr. Sanjay Rathi, PhD student under Dr. Arti Kashyap has been selected for the postdoctoral fellowship at the University of Oxford.

Recent Distinguished lectures

- **Topic:** Talk on Human-centered computing.
  Date: June 13, 2018
  Speaker: Dr. Subramanian Ramanathan, Assistant Professor, University of Glasgow.

- **Topic:** Talk on Writing Efficient Programs for Multicore Systems.
  Date: June 12, 2018
  Speaker : Dr. V. Krishna Nandivada, Associate Professor, CSE, IIT Madras.

Topic: IEEE lecture on Smart Distribution Grid – Towards Efficient Electricity Management.

Date: June 7, 2018

Speaker : Dr. Naran Pindoriya, Associate Professor, IIT Gandhinagar.

> **Topic:** Talk on Accelerating Applications with Heterogeneous Architectures.
> **Date:** May 29, 2018
> **Speaker** : Prof Kolin Paul, IIT Delhi.

> **Topic:** Lecture on Semi-Conductor Manufacturing for Space Application and Compound Semiconductors Technologies: Application & Approach.
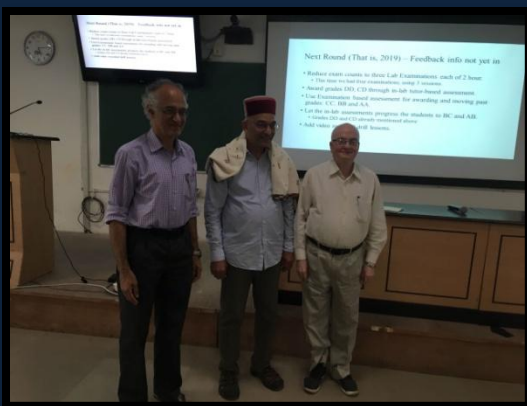> **Date:** May 23-24, 2018
> **Speaker** : Dr. M. K. Hooda, Advance Technology Development Division, SCL, Mohali.

> **Topic:** Talk on soft requirement guided synthesis of robust controllers from logical requirement specification.
> **Date:** May 22, 2018
> **Speaker** : Prof Paritosh Pandya from TIFR.

Topic: Talk on Laboratory courses in CSE Teaching.

Date: May 16,2018

Speaker : Prof. Vishv Malhotra, Department of CSE, IIT Guwahati

> **Topic:** Talk on puzzles involving logic and reasoning-about-knowledge titled Hundred Prisoners and a Lightbulb.
> **Date:** May 14,2018
> **Speaker** : Prof. Hans van Ditmarsch, senior researcher at CNRS

- **Topic:** Talk about100 years of Telecom
  Date: May 10,2018
  Speaker : Prof. S.C. Shahsrabuddhe

- **Topic:** Improving and Estimating the Value of Decisions
  Date: May 3,2018
  Speaker : Prof. Emilia Mendes (Professor, Computer Science, BTH Sweden)

- **Topic:** Research seminar on Distributed Rule-Based Ontology Reasoning
  Date: April 30,2018
  Speaker : Dr. Raghava Mutharaju, Research, GE Global Research in Niskayuna, USA

- **Topic**: IEEE PES-IAS Lecture Series on Inverter Duty Machine Design
  Date: April 27,2018
  Speaker : Mr. Sabysachi Roy, Ex. Chief Engineer, WEG India

- **Topic:** Research IEEE PES-IAS Lecture on Large-scale Cryogenic Processes for Future
  Power Generation and Energy Storage Systems
  Date: April 24,2018
  Speaker : Dr. Rohan Datta, IIT Kharagpur

- **Topic:** An Nationalism, Development and Inequality in India.
  Date: April 24, 2018
  Speaker : Prof. Amit Bhaduri, Professor Emeritus, JNU

- **Topic:** The Making of India's Foreign Policy.
  Date: April 18, 2018
  Speaker : Ambassador P.S. Raghavan
  Supported By: Ministry of External Affairs

- **Topic:** IEEE PES-IAS Lecture on Symmetry and Laws of Nature.
  Date: March 27,2018
  Speaker : Prof. P C Deshmukh, IIT Tirupati

- **Topic:** Technology Development and Innovation for Bottom of the Economic Pyramid.
  Date: March 27, 2018
  Speaker : Prof. Ashok Gadgil, University of California Berkeley

- **Topic:** Talk on working principal and application of Imaging Spectroscopic Ellipsometry
  for Material Science, Biological Sciences, Condensed Matter, Chemical Engg,
  Semiconductor studies.
  Date: March 13, 2018
  Speaker : Mr. Sebastian Funke, Application Engineer, Accurion GmbH, Germany

- **Topic:** An Introduction on SiP Technology.
  Date: Feb 15, 2018
  Speaker : Prof. Alan Mickelson, The University of Colorado at Boulder USA

- **Topic:** IEEE PES-IAS Lecture on Network Design with Parametric Uncertainties
  Date: Dec 18, 2017
  Speaker : Dr. Avinash Bhardwaj, CORE, UC Louvain, Belgium

- **Topic:** IEEE Technical Talk on Introduction to High Voltage Engineering
  Date: Dec 08, 2017
  Speaker: Prof. Ravindra Arora, Technical University, Dresden, Germany

Lectures and Workshops by Faculty

- **Dr. Aditya Nigam** delivered an expert lecture at **NITTTR Kolkata**.
- **Dr. Aditya Nigam** delivered an expert lecture at **IIT BHU.**
- **Dr. Aditya Nigam** organised a **Deep Learning** five-day workshop at **AMU**.
- **Dr. Aditya Nigam** organised a full day tutorial at **NCVPRIPG2017** on **"Shallow to Deep Learning "**.
- **Dr. Arti Kashyap** was an invited speaker on **"Special Talk on Big Data Technologies"** at **Govt. Engg. College Ajmer.**
- **Dr. Hitesh Shrimali** as a part of **QEEE** delivered online lectures on **"Design with Opamp" and "BJT/MOSFET amplifier".**
- **Dr. Hitesh Shrimali** taught online course at **IIIT Allahabad** on **"Advance Analog Circuit Designing"**.
- **Dr. Shubhajit Roy Chowdhury** was invited speaker on **"Innovation in Point of Care Testing Medical Devices"** at the Workshop on Innovation organized by **Jawaharlal Nehru Government Engineering College, Sundernagar** on March 14, 2018.
- **Dr. Shubhajit Roy Chowdhury** was invited speaker on **"Point of care testing of patients: Translating health care from hospital to home"** at the International Telemedicine Workshop organized by **CDAC Mohali** on March 07, 2018.
- **Dr. Shubhajit Roy Chowdhury** was invited speaker on **"Neural Networks: A journey from biology to computing to biology"** at the **Centre for Green Energy and Sensing Systems, Indian Institute of Engineering, Science and Technology, Shibpur** on January 30, 2018.
- **Dr. Shubhajit Roy Chowdhury** was invited speaker on **"Translating health care from hospital to home"** at the **TCS Innovation Labs, Kolkata** on January 29, 2018.

Recent SCEE Seminars

- **Speaker:** Dr. Varun Dutt
  Date: : March 22, 2018
  Title: Decisions from Experience: How interaction in a microworld enables reduction of climate misconceptions

- **Speaker:** Dr. Shubhajit Roy Chowdhury
  Date: April 12, 2018
  Title: Design Non invasive diagnosis for point of care testing of patients

- **Speaker:** Dr. Hitesh Shrimali
  Date: April 19, 2018
  Title: Analog Front End Design and Implementation of Silicon Particle Detector in 180 nm BCD Technology

- **Speaker:** Dr. Arnav Bhavsar
  Date: April 26, 2018
  Title: Processing brain images: Some new directions

New Courses

- **Course :** Verification in VLSI-Design
  Course Instructor: Dr Paritosh Pandya, Tata Institute of Fundamental Research, Mumbai and Dr Astrid Kiehn.

- **Course :** Special Topics in Compiler
  Course Instructor: Prof. V. Krishna Nandivada from IIT Madras

- **Course:** Selected Topics in Electric Machine Design
  Course Instructor: Er. Sabyasachi Roy alumnus, Electrical Engineering of IIT Kharagpur and served GEC India Ltd for several years as an Electrical Machine designer.

- **Course:** Selected topics in Multimedia Applications using Deep Learning

Upcoming Events

Topic: International Workshop on Applied Deep Learning
Date: 16 July to 20 July 2018.
Organizer: Dr. Aditya Nigam(IIT Mandi), Dr. Kamlesh Tiwari(BITS Pilani)
Speakers: Dr. Aditya Nigam, Dr. Kamlesh Tiwari, Dr. Arnav Bhavsar, Dr. Dileep A.D.

Topic: International workshop on "Nano/Micro 2D-3D Fabrication, Manufacturing of Electronic–Biomedical Devices & Applications" (IWNEBD-2018)
Date: 31st October to 2nd November 2018.
Organizer: Patron-Prof. Timothy A Gonsalves,
Speakers: Prof. Ashutosh Sharma, Dr. Ajay Kumar, Shri Ajay Prakash Sawhney, Prof. V. Ramgopal Rao, Dr. Vivek Singh, Prof. Nan M. Jokerst, Dr. Patrick Naulleau, Prof. Santanu Chaudhury, Prof. Habil. Jorg Schulze, Prof. M. Jagadesh Kumar, Prof. Ola L. A. Harrysson, Dr. M. S. M. Saifullah, Prof. Aaron D. Franklin, Prof. Nandita Dasgupta, Prof. Bodh Raj Mehta, Prof. Kuen-Yu Tsai, Ms. Allyson Hartzell, Prof. Kenneth Gonsalves, Prof. Kamaljit Rangra, Dr. Sourabh Ghosh, Prof. Enakshi Bhattacharya, Mr. Prashant Verma, Dr. Udayan Ganguly, Dr. Ajay Kumar Garg, Mr. Anant Naik, Shri D. Sam Dayala Dev, Mr. Paritosh Jain, Dr. Pushpraj Singh, Dr. Kasturi Saha, Dr. Suchandan Pal, Dr. Shailja Vaidya Gupta, Dr. Rajiv K Tayal

IIT MANDI

INTERNATIONAL WORKSHOP

ON

NANO/MICRO 2D-3D FABRICATION, MANUFACTURING OF ELECTRONIC – BIOMEDICAL DEVICES & APPLICATIONS

IWNEBD-2018

31ST OCTOBER – 2ND NOVEMBER, 2018

Indian Institute of Technology (IIT) Mandi, MANDI- 175 005 (Himachal Pradesh), India

Student's Placement Statistics

Statistics for 2018 Batch (Computed On The Basis Of The No. Of Students Sitting For Placement in Respective Streams)

Percentage of B.Tech (CSE) students placed: 100%*

Percentage of B.Tech (EE) students placed: 83 %*

*Based on the data available as on 18.05.2018

Companies who recruited our students: Amazon, Directi, Goldman Sachs, Oyorooms, DE Shaw, ISRO, Finisar, Samsung, Future First, Internet Academy, Nucleus Software, MAQ Software, Capgemini, Smartprix, LnT Ltd., LnT ECC, Vehant, Infosys, Cognizant, Wipro, Addverb, Toppr, Codenation, Play simple, R system, Delhivery, UHG, Mojo Networks, Khosla Labs, Palc Networks, Siemens, Kisan Hub, Tejas Networks, HPCL, TCS, Lepton maps, Accenture, Turing softek, Wisig networks, P2 power, ZS associates, Maruti, Transweb, Dolcera, Lithion Power, Endeavor Careers Pvt. Ltd, Vijna labs.

IIT Mandi SCEE family

Statistics of Students

No. of current M.S. students: 16

No. of M.S. students graduated: 15

No. of current Ph.D. students: 65

Statistics of SCEE faculty members:

Total no. of regular faculty members: 34