Message from the Editor

Dear colleagues and students,

As we say good-bye to this year of uncertainty and get ready to gradually bring life back to campus, it is my pleasure to present Volume 05, Issue 02 of the SCEE Newsletter ElectronWave. I must appreciate the dedication of the TAs and my co-editors who have been in constant touch from across the country, and all of you who have contributed content.

This edition comprises of an interview with Dr. Bharat Singh Rajpurohit, who discusses his wide experience being involved in various academic and administrative developments at the institute over several years. We also welcome a new faculty member in our fraternity, who managed to join amidst the travel restrictions and associated challenges.

We hope that the next edition of ElectronWave gets to describe events held in person, in a Covid-free Kamand valley. SCEE @IITMandi has continued to scale heights during tough times, and is ready to keep hiking ahead.

Yours sincerely,
Manas Thakur
What’s Inside

1. Face to Face with Dr. Bharat Singh Rajpurohit
2. Awards and Recognitions
3. Publications and Patents
4. Distinguished Lectures
5. Seminars and Workshops
6. Student Achievements
7. Student Details
8. Research Projects
9. New Faculty Details
Q. Who are you and what do you do?

I am a faculty member of SCEE in the electrical and power area. My research expertise lies in Power System, Power Electronics and Renewable Energy. I am also looking to work in an area where power can be utilized for society. Teaching wise I am involved in Electrical Power like Machines, Power Systems, Special electrical machines, Drives and High Voltage.

Q. How do you find the development in students' perspectives from IIT Kanpur to IIT Mandi?

Whether it is IIT Kanpur or IIT Mandi, even when I was in IIT Roorkee in 2004, I can see a drastic change in teaching and learning considering the availability of online material. Nowadays, the teachers’ role is more about introducing the common basic subjects and it is expected from students to learn by themselves. In earlier times, the style of learning was where the teacher spends time doing tutorials by sitting with students and making them profound in rigorous analytical solving skills. So, this type of skill development is changing as students can access short YouTube videos, NPTEL and Coursera videos. The students’ learning method is also changing; I remember when I was doing my undergraduate, there were very few books available in the market, whereas now we have Amazon/Flipkart where we can browse a good number of books by viewing the ratings and reviews and get any book not only from India but also from abroad. Hence the resources are in abundance but the problem is that the time is limited.

Q. You served as the Dean (Faculty), then as the Chairperson of SCEE too. How do you find the progress in academic structure and changes/improvements in the curriculum?

We had started at IIT Mandi with just a couple of courses. There was no concept of core or elective courses, but computer science courses were well-structured from the beginning because our director during that time was from that area. Later we had many brainstorming sessions with external experts and then we were able to prepare the courses. The fundamental principle of developing the course curriculum at IIT Mandi was to have a broad engineering curriculum rather than a narrow discipline-based curriculum. So we can see that IIT Mandi has a branch to take care of Electrical and Electronics and Computer Science Engineering. In other institutes, we can see that there are two subjects Electrical Engineering and Electronics Engineering but here we are expecting that in basic Electrical Engineering, core subjects should be taught based on students’ interest and we would be able to take up disciplines and expertise in a particular domain of Electrical Engineering. So, this is what our thought process was in the beginning. Out of 160 credits, around only 30 credits belonged to core courses.

Then we started a few courses to see how students learning can be transferred to society; thus, a few courses have been developed for students at IIT Mandi to have an all-round personality and be able to understand what the society needs. Gradually, after 10 years of progress, we are now planning to revise our curriculum further, using a feedback mechanism.
As a faculty member, I can see that the curriculums at other IITs such as IIT Bombay and IIT Kanpur are also changing to similar what we currently have. So, it shows that the pattern that we have started 8 years ago is now being followed by other institutions as well. It seems that the overall environment of recruiters/stakeholders want such all-round students because the technology is changing so fast and what we teach students today may not remain stationary for 30 years. We should ensure that students are learning new technologies and a new way of acquiring skills and are getting better attitude and aptitude to become successful in upcoming future careers.

**Q. Please let us know your viewpoint on taking up studies at IITs in India and other universities abroad.**

This is a very good question. Recently I have been to Germany, particularly to TU in Dresden, Aachen and I have been to a couple of cities in the UK and US as well. I have deliberated over this point with colleagues and students over there (Indian students especially). and one thing I can see in German Universities considering Engineering specialization, is that their learning is not dedicated completely to the classroom but also outside the classroom where they do many projects during their undergraduate and postgraduate years. Thus, students over there are gaining a good experience of doing projects and they can earn remuneration which can help in their studies. Importantly, those projects are not routine academic projects but industry-sponsored projects in which they can accomplish a small part of those industry-sponsored projects. So by doing those projects they can actually learn the skills required in the industry and know the expectations of the industry, thus shortening the gap between academia and industry. This part is missing in Indian institutions. This is due to the reason that the projects we are carrying in academia are research-oriented but not industry projects so the interaction is less. Consequently, the students who are graduating from Indian institutions need to be given detailed onsite training. In Germany I noticed that a postgraduate student who is just submitting a master’s thesis can go and join a German industry because they had already worked in problems relevant for such industries. Thus, apart from the routine classroom/lab learning, students need to do a lot of smaller projects based on their availability and interests. They need to see what industry is working on so that they can make themselves ready. For Computer Science, it is very easy as the required facility is easily available compared to disciplines such as Mechanical and Electrical Engineering. Such type of atmosphere needs to be created. It requires help from the industry too. Thus, this is an important thing which needs to be addressed at Indian institutions.

**Q. Your research has focused on renewable energy resources that offer sustainability. Would you please discuss the challenges and future directions in this area?**

I had started research in my Ph.D. in the area of large-scale grid integration of renewable energy resources. Slowly I could see that the grid could manage a good penetration level of energy resources like wind, solar and power grid can also provide a robust infrastructure and green corridor such that power can also be evacuated very easily from the remote area so that it would be in continuous progress. One important thing which I can see is that technology is not limited to renewable energy resources. Many other challenges are coming which need to be addressed, such as strengthening our power infrastructure for an e-vehicle.
By 2030 we should be able to see a good penetration level of e-vehicles in our society and hence renewable energy resources will be able to utilize the availability of e-vehicles, in order to address their intermittent usage. 

Other than this we are also able to see other sources such as hydrogen storage, increase in hydrogen utilization etc. Thus, we need to ensure safe use of hydrogen energy, which can thus act as balancing the intermittency of renewable energy resources. Overall, I can see that the Indian power system is going in the right direction, with a well-behaved system and this will hopefully continue in the coming years. However, we have to focus more on better management with respect to renewable energy installation. An increase in electric load is also here and we see how intermittency of renewable energy resources can be taken care of very easily. Thus, overall, the research in the area of renewable energy resources has matured, but the managerial problem by which renewable energy resources can be utilized maximally for a given load-demand needs to be addressed.

Q. How do you define your journey as a student to a researcher to a teacher then as an author?

During my studies, I was sincere and used to sit on the first bench, with focus on learning. I am grateful to the society, to the institutions with great teachers, as somehow due to their company/guidance, the path that was given to me inspired me to remain in the teaching field and see that I can contribute something in research. During this time, I also got influenced by a couple of colleagues who were present in the institution in Quality Improvement Programs at IIT Kanpur and IIT Roorkee. Due to their influence, I got motivated to join teaching as a profession. When I joined IIT Mandi, I could see that the role of a teacher is not just teaching but (s)he has to play many roles simultaneously, including teaching, research guidance, act as a mentor and also participate in administration. On top of this, they need to bring research funding too. Overall, in that sense, I can see that a teacher’s role is more like a manager managing different things simultaneously. Some of my colleagues are good teachers managing their roles and should be appreciated. But for a successful faculty member at Indian institutes, it is required that a faculty member should be very good in managerial roles apart from teaching roles.

I made a good bonding with my professor at IIT Kanpur Prof. Ravindra Arora. He has offered few courses at IIT Mandi as well. He started some teaching activities especially in the area of High Voltage (HV) at IIT Mandi around 2015. Slowly, the material got solidified and we thought why not write a book in the area of HV. As Prof. Arora had written books in this area but at a high research and PG level, so we saw an opportunity there and based on our teaching here, we made an effort to write a book at the undergraduate level and within 3-4 years we published a book on HV.

Q. What is your suggestion to students on finding opportunities in these pandemic times?

I want to say that this pandemic has given some constraints. Sometimes it is also said that mother nature is giving us a small lesson that whatever life humans are living on earth is not sustainable. So, in that sense, this is a small lesson in a gentler way so that we, especially as an engineering community, think about what can be done to make our earth a place where we can stay more sustainably. I don’t see this pandemic as a time of issue, but I see this as an opportunity where an engineering student can provide many solutions that would be more sustainable. Coming to the possibilities, the pandemic effect is now over and this year of placement session is as good as the previous year or even better, hence I am hopeful we would be able place the students decently this year as well.
Q. You are known to be an approachable and empathetic person. How would you explain the relationship between a faculty member and a research scholar?

At IIT Mandi I can see that the facilities were very limited earlier and we had started very humbly. We had a small community including faculty members, staff and students to begin with. Over time we could do many activities at the same time with limited resources. So, I think the approachability came to not only me but also to my colleagues who joined at that time. Slowly we understood that the research scholar who is here is not an academic load to us; they are our supporting hands by which we can work efficiently. Thus, this becomes a larger academic family rather than the role of a teacher and a researcher. As our campus is small and as we have a very small student to teacher ratio, maintaining approachability becomes easier. However, now that the institution is growing through the north and south campuses, more efforts need to be made to maintain the same in future. I would like to add one more point that this culture is set by our previous director: His door was always open for any meeting. I vaguely remember if I ever took an appointment to meet him. Most of the time it was just like walking straight and talking to him. I hope our institute will retain this culture.

Q. Lastly, what advice would you like to give to the students at IIT Mandi?

My advice for the students is that though whatever we try here is to receive a degree, yet I believe that getting a degree is a very small part of life and it is not the complete life. We have to see the bigger picture. So while studying make sure you work hard, but ensure that you also find time to enjoy the life which you get in this beautiful environment.
Awards and Recognitions

1. Dr. Shubhajit Roy Chowdhury has been selected as Review Editor of Frontiers in Computational Neuroscience in August 2020.

2. Dr. Varun Dutt deployed Automatic Thermal Screening System (ATSS) in the District Commissioner’s office at Mandi.

Publications and Patents

- 23 JOURNALS
- 21 CONFERENCES
- 2 PATENTS
- 3 BOOKS
1. Dr. Himanshu Misra
   - Delivered a lecture in online one-week short-term course on Research Trends in Energy and Power Systems (RTEPS) at MANIT Bhopal.
   - Delivered a lecture in online one-week short-term course on Recent Trends in Microgrid-2020 (RTM-2020) at NIT Jamshedpur.
   - Delivered a lecture in online one-week short-term course at JEC Jabalpur.

2. Dr. Hitesh Shrimali
   - Faculty Development Program for JUIT.
   - Faculty Development Program talk for NIT Jalandhar.

3. Dr. Shubhajit Roy Chowdhury
   - Delivered a lecture on “Non-invasive sensing of pathophysiological parameters at the point of care” at the Faculty Development Programme on Sensor Technology, National Institute of Engineering, Mysuru, September 21-25, 2020.
   - Delivered a lecture on “Interdisciplinarity in Research” at the Faculty Induction Programme on Research Methodology, South Asian Institute for Advanced Research and Development, September 20-24, 2020.
4. Dr. Varun Dutt

- Research talk on the influence of subnetting in networks involving honeypots via the Hack IT tool at Russia-Indo Scientific Russia-India Webinar in “Cyber-physical systems; Society 5.0; Artificial Intelligence” on October 28-29, 2020.

- Lecture on the “ACT-R” Short Term course on Cognition and Computation hosted by IIT Roorkee.

5. Dr. Manas Thakur

- Delivered a multi-institutional webinar on “Java Performance in HotSpot JVM” organized by KITS Ramtek, Nagpur.

- Delivered a talk titled “Efficiency in Pointer Analysis: The Road Ahead” at the 2nd Software Engineering Research in India Update Meeting (SERI 2020), organized virtually by IIIT Hyderabad.

6. Dr. Pratim Kundu

- A lecture on applications of wide area measurements systems on remedial action schemes at MNNIT Allahabad as a part of a short-term course.

Seminars and Workshops

1. Dr. Srikant Srinivasan

- Invited lecture at Recent Advances in Data Science held from October 19-23, 2020 jointly organized by the Rajiv Gandhi National Institute of Youth Development, Sriperumbudur, Tamil Nadu.

- Invited presentation at 'Data Analytics Webinar' conducted by the Russian-Indian network of Universities on October 7, 2020.

2. Dr. Varun Dutt

**Student Achievements**

1. Dr. Varun Dutt’s student Shashank Uttrani (S19022) got a scholarship for his presentation at BriMS.

2. Dipanshu Verma (B18054) and Ayushman Dixit (B18164) built an app that in COVID era restricted army officers to accumulate in shops. It is hosted at [acsa.iiots.in](http://acsa.iiots.in).

**Student Details**

- 71 Ph.D. Scholars
- 32 M.S. Scholars
- 103 M.Tech Students
- 556 B.Tech Students
Research Projects

1. Dr. Himanshu Misra
   - Control of Permanent magnet synchronous machine for efficient operation of Electric Vehicle Funding authority: SERB Amount sanctioned: 30 Lac (approx).

2. Dr. Srikant Srinivasan
   - High Throughput Phenotyping for Agricultural crops, Arnetta Tech Pvt Ltd, 8 Lac (approx).

3. Dr. Manas Thakur, Dr. Srikant Srinivasan, Dr. Shyam Kumar Masakapalli (SBS) and Dr. Ramna Thakur (SHSS)
   - Sustainable Irrigation Advisories for Mid-Himalayan Farmers using Smart Satellite Image Analytics, DST - Indo-Denmark, 1 crore (approx).

4. Dr. Varun Dutt
   - Human performance enhancement via tDCS in VR and performance forecasting via machine learning methods, Life Sciences Research Board (LSRB), DRDO, INR 49,13,480.
   - Replicating human cognitive behaviour on robots’ models using ACT-R and machine learning for search-and-retrieve missions in a virtual environment, Center for Artificial Intelligence and Robotics (CAIR), DRDO, INR 35,58,400.

5. Dr. Pratim Kundu
   - Working with North American Synchro phasor Initiative (NASPI) for development of white paper on PMU applications for control of power system.
**Dr. Srikanth Sugavanam**

Srikanth Sugavanam is an Assistant Professor with the School of Computing and Electrical Engineering at IIT Mandi, India. He did his B.Sc in Physics from B.G.E.S College, Kolkata and B.Tech in Optics and Photonics from the Applied Optics and Photonics Department of the University of Calcutta. He further pursued his M.S. degrees in Photonics from the Warsaw University of Technology, Poland and Friedrich Schiller University, Jena, Germany under the Erasmus Mundus OpSciTech programme. He completed his PhD in 2015 from the AIPT under Prof. Sergei Turitsyn, specialising in the area of real-time intensity and spectral measurements of fibre laser dynamics. He then continued to work with AIPT as a post-doctoral research scientist, continuing work in his PhD specialty. Apart from this, he has also worked in the area of optical metamaterials, Raman fibre lasers and random fibre lasers. His contributions have featured in several international journals, including Nature Photonics and Nature Communications.
“We are shaped by our thoughts; we become what we think.”

- Buddha

Editor:
Dr. Manas Thakur
SCEE, IIT Mandi

Co-Editors:
Dr. Shubhajit Roy Chowdhury
Dr. Srinivasu Bodapati

Sai Sushma (S19012)
Prakash Neupane (S19029)

Design & Development
Harshita Arya (S19025)