



**High-End workshop  
(Karyashala)**



**On**

**Future Intelligent Network Toward 6G: Machine-Learning Approaches  
(FINT6G)**

**Sponsored by Science and Engineering Research Board (SERB), India**

**24<sup>th</sup> - 30<sup>th</sup> July 2022**

**(Physical Mode)**



**Department of Electronics and  
Communication Engineering,  
National Institute of Technology Rourkela  
Rourkela-769008, Odisha, India**

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## Course Relevance

Now scientific community with Industry stakeholders are working towards formalizing the roadmap for 6G. 6G is considered transforming from “Connected Things” to “Connected Intelligence.” Next-generation networks would add new radio interfaces like Terahertz communication, intelligent reflecting surface, vast aperture arrays, and joint radar communication for connecting to the heterogeneous hardware/software networks to achieve the required vital parameters. The future radio access network would be based on an AI-enabled Intelligent radio system. In an AI-enabled radio system on the fly, hardware and software up-gradation would be expected based on a deep neural network. Hence, communication engineers, students, and researchers must understand the fundamentals of emerging wireless technologies and AI to be employed in a rapidly growing wireless industry.

## Course Objectives

- Bridge together industry and academic professionals in wireless communication and Machine learning
- Share experiences, and initiate efforts towards highlighting open problems in the next-generation wireless communication
- Workshop participants will learn about the recent trends in 5G and beyond and apply AI to wireless communication systems and their fundamentals
- Some hands-on sessions will give practical exposure to the application of AI to wireless communication systems

## Karyashala Scheme

Karyashala is an effort by Science and Engineering Research Board (SERB), Government of India via Accelerate Vigyan to improve the research productivity of promising PG and Ph.D. students from universities and colleges through high-end workshops on specific themes. This program aims to provide opportunities to acquire specialized research skills.

## Resource Persons

**Dr. Saswat Chakrabarti,** IIT Kharagpur

**Dr. Shankar Prakriya,** IIT Delhi

**Dr. Vimal Bhatia,** IIT Indore

**Dr. Amit K Mishra,** University of Cape Town

**Dr. Preetam Kumar,** IIT Patna

**Dr. Sudan Majhi,** IISC Bangalore

**Dr. Sarat Kumar Patra,** IIIT Vadodara

**Dr. Kamalakanta Mahapatra,** NIT Rourkela

**Dr. Poonam Singh,** NIT Rourkela

**Dr. Pyari Mohan Pradhan,** IIT Roorkee

**Dr. Himanshu B. Mishra,** IIT Dhanbad

**Dr. Siddhartha S. Borkotoky,** IIT Bhubaneswar

**Dr. Arya Sudhanshu,** Pukyong National University, South Korea

**Dr. Debiprasad P. Acharya,** NIT Rourkela

**Dr. Samit Ari,** NIT Rourkela

**Dr. Santos Kumar Das,** NIT Rourkela

**Dr. Siddharth Deshmukh,** NIT Rourkela

**Dr. Pankaj Kumar Sharma,** NIT Rourkela

**Dr. Upendra Kumar Sahoo,** NIT Rourkela

**Dr. Ajit Kumar Sahoo,** NIT Rourkela

**Dr. Pawan Kumar,** NIT Rourkela

## Industry Resource Persons

**Dr. Pallab Maji,** NVIDIA, Bangalore

**Dr. Praful P. Pai,** MathWorks India

**Mr. Vijay Kumar,** DRDO, Hyderabad

**Mr. Umesh Sajjanar,** Cisco Systems, Bangalore

**Mr. Ravi Siddanath,** Broadcom Corporation, Bangalore

## Student Coordinators

**Mr. Goutam Kumar Sahoo (9437274044)**

**Mr. Bibekananda Panda (9658013389)**

**Ms. Anusaya Swain (9658448388)**

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### About the Institute

National Institute of Technology (NIT), Rourkela, was founded as Regional Engineering College, Rourkela, in 1961. It is a prestigious institute with a reputation for excellence at both undergraduate and postgraduate levels, fostering the spirit of national integration among the students, close interaction with industry, and a strong emphasis on basic and applied research. The city of Rourkela is a bustling industrial city, cosmopolitan by nature, and is well connected to all parts of the country by road and rail. The nearest airports are Ranchi, Kolkata, and Bhubaneswar, which are well connected by trains. Please visit <https://www.nitrkl.ac.in/About.aspx> to know more about NIT Rourkela.

### About the Department

The Department of Electronics and Communication Engineering at NIT Rourkela covers various subjects, including electronic circuits, microprocessors, digital signal processing, image processing, computer vision, soft computing, analog communication, digital communication, mobile communication, VLSI, Embedded Systems, and many more. The department has laboratories catering to all the subjects of studies. Faculty members of the department work in different specializations under the groups: Communication engineering, VLSI and embedded systems, Signal Processing, and Instrumentation. Research projects are being conducted by faculty members with funding from organizations such as ISRO, DST, DRDO, and BRFST.

### Topics to be covered

- Evolution from 1G to 6G and Technical Challenges in wireless communication
- Introduction to mathematical tools for wireless system modeling and performance analysis

- Software Defined Radio and hands-on practice of wireless communication implementation on SDR
- 5G system overview: New Radio concept, 6G system evolution NOMA, IoT, mmWave, Massive MIMO wireless communication, cognitive radio systems, THz communication future of 6G
- Introduction to different neural networks, Reinforcement learning, and Federated learning
- Neuromorphic computing for wireless communication, Introduction to Deep Learning tools: Tensor Flow, Keras, Demos of Deep Learning Networks using Google Co-lab

### Registration and Guidelines

- **The course will be completely free of cost for the shortlisted participants in Physical mode.**
- The participants will be limited to 25 candidates (as per SERB norms). The applicants shall produce an endorsement letter from their Head of the department indicating their enrolment with the institute and a “No Objection Certificate (NOC)” for permitting them to undergo training in the workshop if selected.
- A certificate regarding the successful completion of the workshop shall be issued to the participants.
- **Accommodation, food and travel allowance by train (as per GOI norms) will be provided to the selected participants.**

### How to apply

Interested participants can apply through the Google form: <https://forms.gle/5Z4dZncevQ6xDuwu6>

- **Registration Deadline: 21<sup>st</sup> July 2022**
- **Confirmation to Participants by email: 22<sup>nd</sup> July 2022**

### Contact details:

Please send your queries directly to the course coordinators.

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Mob: +91-6398053220

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**24<sup>th</sup> – 30<sup>th</sup> July 2022**

### REGISTRATION FORM

1. Name: .....
2. Designation: .....
3. Institute: .....
4. Qualification (M.Tech/Ph.D): .....
5. Branch: .....
6. Specialization: .....
7. Correspondence Address: .....  
.....
8. Mob. ....
9. E-Mail: .....
8. Any other Information:

Date:

Place:

Signature of the applicant

Recommended by HOD/Supervisor (for students only)

(Sign & Seal)