

# Faculty Development Program on Metasurfaces: Theory, Design and Application

Under the banner of  
Electronics and ICT academy,  
National Institute of Technology, Patna

17<sup>th</sup> - 21<sup>st</sup> December, 2018



**Patron**  
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Director, NIT, Patna

**Coordinator (NIT Patna)**  
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Mr. Pankaj Kumar

**Sponsored by**  
Ministry of Electronics & Information  
Technology, Govt. of India

**Organized by**  
Department of Electronics and  
Communication Engineering,  
National Institute of Technology,  
Patna-800005

## About NIT Patna

National Institute of Technology Patna is the 18<sup>th</sup> National Institute of Technology created by the Ministry of H.R.D. Government of India after rechristening the erstwhile Bihar College of Engineering Patna on 28.01.2004. NIT Patna marked its humble beginning in 1886 with the establishment of pleaders survey training school which was subsequently promoted to Bihar College of Engineering Patna in 1924. This made this institute the 6<sup>th</sup> oldest Engineering Institute of India. The Institute is situated on the south bank of holy river Ganges behind Gandhi Ghat (where the ash of father of the Nation, Mahatma Gandhi was offered in the river Ganges). The campus has a picturesque river view with historic building presenting a spectacle of architecture delight and natural beauty. The Institute imparts high level education training, research and development in science, engineering technology and humanities along with high quality education and values at UG, PG and Ph.D. level. At present the Institute offers courses in six major technical disciplines viz. Architecture, Civil Engineering, Computer Science & Engg., Electrical Engg., Electronics & Communication Engg. and Mechanical Engg. It also consists of well-established departments of Physics, Chemistry, Mathematics and Humanities and Social Sciences.

## Electronics and ICT Academy

Ministry of Electronics and Information Technology, Government of India has instituted seven Electronics and Information & Communications Technology (ICT) Academies of which, the academy of NIT Patna is one. The Academy at NIT Patna aims to design and organize basic as well as specialized training programmes in niche areas of electronics and ICT for the development of required knowledge base, skills and tools to equip the teaching community with better knowledge and understanding.

## Overview

In recent years, there has been noteworthy developments in the area of engineered materials to fulfill need of this cutting edge technology. Metamaterials started a window in size reduction and performance enhancement. 2D metamaterial popularly known as metasurface proves to be promising. Metasurfaces are ultra-sub-wavelength thick material having the advantages of lightweight, ease of

fabrication, and ability to control wave propagation in different media in the GHz and THz frequencies. This program would focus on the basic concepts of different metasurfaces and its design as well as practical realization for various applications.

## Objective and Scope

- To familiarize the audience with the metasurface and their applications.
- To introduce fundamental concepts for moving from metamaterials to metasurface.
- To disseminate the methodologies for metasurface analysis.
- To develop skills to overcome underlying challenges.
- To familiarize the audience with the tools for metasurface design and available infrastructure in national level.
- To gain experience of doing independent study and research.

## Course Content

- Overview of metasurface technology.
- Types of metasurfaces.
- Applications of metasurfaces
- Electromagnetics analysis of metasurface.
- Tuning of metasurface properties.
- Multi-controlable metasurfaces.
- Frequency selective metasurfaces.
- Metasurface based absorber.
- Metasurface based antennas.
- Metasurfaces for signal transmission

## Outcomes

By the end of the program, the participants should:

- Understand the usefulness of metasurface and applications.
- Know the fundamental concepts of metasurface technology.
- Analyze the metasurface device characteristics.
- Know how to apply tools for effective metasurface design.
- Know how to apply fundamental concepts in analysis of metasurface.
- Get motivation for further studies and research in the state-of-the-art technology.

## Who Can Participate

Industry personals, Faculty members of UGC/AICTE recognized Universities and Engineering colleges all over India, Research scholars, PG/UG. students, however there are very limited number of seats for PG/UG students; priority will be given to the faculty members and Ph.D. students.

## Resource Person

Prof. Akhlesh Lakhtakia, Pennsylvania State University, Pennsylvania, US.

Prof. S. Anantha Ramakrishna, IIT Kanpur.

Prof. P. K. Jain, NIT Patna, (IIT (BHU), Varanasi).

Dr. Somak Bhattachaya, IIT (BHU), Varanasi

Dr. Jayanta Ghosh, NIT Patna

## Registration Fee

- ✚ Faculty Member: Rs 1000/-
- ✚ Ph.D/PG/UG Students : Rs 500/-
- ✚ Industry Personnel: Rs 3000/-

Registration fee includes Registration kit, Tea, Snacks, Lunch and a Course Completion Certificate. **Certificate will be given by Electronics & ICT Academy NIT Patna.**

## Registration Process

1. Scanned copy of the filled application form duly endorsed by the forwarding authority and the demand draft are to be mailed at ([mmahto@nitp.ac.in](mailto:mmahto@nitp.ac.in)). No travelling allowance will be paid by the Academy. The demand draft as applicable, should be drawn in favour of "Director, NIT Patna" payable at Patna.
2. Registration fee can also be paid by the online mode, the account details for this purpose is

Account Name: NIT Patna  
Account No.: 50380476798  
IFSC Code: ALLA0212286

3. Selection will be made purely on First-Come-First-Serve basis (Subject to fulfilling the eligibility criteria).

4. Maximum fifty (50) participants will be accommodated in the program.
5. The brochure and the registration form may be downloaded from the Institute website [www.nitp.ac.in](http://www.nitp.ac.in).

**The registration fee can also be deposited in cash.**

**Last date of submission of application: 15<sup>th</sup> December, 2018.**

## Address for Correspondence

**Enquiry should be addressed to:**

**Dr. Manpuran Mahto**

Assistant Professor

Dept. of Electronics & Communication Engg.,  
NIT Patna-800005

Mob. No.: 07752957828,

Email: [mmahto@nitp.ac.in](mailto:mmahto@nitp.ac.in)

## Venue

Department of Electronics and Communication Engineering, NIT Patna.

## Accommodation

Accommodation will be provided in hostels as per the availability with nominal charges.

## Location

Patna Railway Junction is well connected to almost all parts of the India. NIT Patna is located within a distance of only about 6 km from the Patna Railway Junction. Also Patna Jay Prakash Narayan International Airport is well connected via Air to the whole India. There are direct flights to Patna from Kolkata, Delhi, Chennai, Mumbai, Bengaluru, etc. The Institute is located within a distance of about 11 km from the airport. Taxis, Auto-rickshaws, are available as conveyance.

## Advisory Committee

Prof. P. K. Jain, Director, NIT, Patna

Dr. Gayadhar Pradhan, HOD (ECE), NIT Patna.

## Faculty Development Program on

**Metasurfaces: Theory, Design and Application**  
(17<sup>th</sup> - 21<sup>st</sup> December, 2018)

## REGISTRATION FORM

1. Name (block letter): .....

(a) Gender  Male  Female

(b) Category  Gen  OBC  SC  ST

2. Designation .....

3. Organization: .....

4. Highest Academic Qualification: .....

5. Experience (in years):

(a) Teaching: .....(b) Industrial .....

6. Address for communication: .....

.....

.....

Pin code: .....Ph. No.: .....

E-mail: .....

7. Mode of Payment Through

DD  NEFT  CASH

8. DD/NEFT Trn Ref no. : .....

Date: .....

Bank Name:.....Amount: .....

## DECLARATION

**I do hereby agree to abide by the rules and regulations of the FDP.**

Place: .....

Date: .....

.....

**Signature of the applicant**