

Five days workshop on

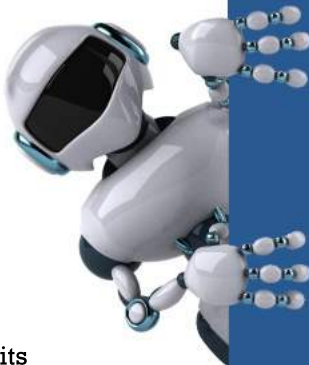
# Electronic Systems for Mechanical Automation & Robotic Technology

[TEQIP III SPONSORED]

20th– 24th May, 2019

## Objective:

1. To share in-depth knowledge of robotic technologies from design to development in real-time applications.
2. Bio-inspired robotics: Concepts from nature and applying them to the design of real-world engineered systems.
3. Basic concepts and algorithms required to develop mobile robots that act autonomously in complex environments. Design, simulation and implementation of robot motion planning algorithms.
4. MEMS capabilities in the robot community that lead to the possibility of new robotics devices and systems. Recent trends and developments in Automation and Sensors.
5. To acquaint the participants with robotics, its history and application in the present and future.
6. Conventional methods to model cognitive capabilities in robots cannot deal with the uncertainty inevitable in human-robot interaction.
7. Biomimetic and Cognitive robotics for future applications.
8. To bridge the gap between academic learning and industry demands in automation & control with exploring the future direction towards the 4th generation automotive industries.



## eSMART 2019

Association with:



**Strategi**  
AUTOMATION SOLUTIONS PVT LTD



## Speakers:



Prof. S.M. Hazarika,  
IIT Guwahati



Prof. S. Bhaumik, Dean R&C,  
IEST Shibpur



Dr. A. Thakur,  
IIT Patna



Dr. S. K. Pandey,  
IIT Patna



Dr. M. Mukherjee, Sr. Scientists,  
CSIR-CMERI, Durgapur



Y. Srivastava,  
Director, VSD Enterprises

## Coordinators

**Dr. Yogesh Singh**

**Dr. Bipul Das**

**Dr. Shivendra Kumar Pandey**

## Organized by:

Department of Mechanical Engineering And  
Department of Electronics & Instrumentation Engineering,  
National Institute of Technology Silchar

Silchar-788010, Assam, India

Web: <http://www.nits.ac.in>

## ABOUT NIT SILCHAR

National Institute of Technology (NIT) Silchar, an Institute of National Importance under the NIT Act was established in 1967 as Regional Engineering College (REC) Silchar in Assam. In year 2002, it was upgraded to the status of an NIT from REC. NIT Silchar is situated on the banks of river Barak and on a sprawling campus spread over 600 acres of land on the outskirts of Silchar. The landscape of NIT Silchar campus is beautiful with natural lakes and hillocks, surrounded by tea gardens. NIT Silchar is a fully residential institution with nine hostels for boys and two hostels for girls. It has six engineering degree offering branches and five non-engineering branches. It conducts various programmes, including organizing the workshops, seminars, conferences, invited talks etc. in collaboration with different academic departments, institutes and reputed multinational and national industries. **NIT Silchar has reached to 51th position in NIRF 2019 ranking.**

## ELIGIBILITY

This program is open to industrial personnel, faculty members and research scholars/PG/UG students of technical institutions, engineering colleges, polytechnics, universities and other recognized institutions

## REGISTRATION PROCESS

Scanned copies of both registration form along with D.D. (or online transfer proof) are to be sent to **bipul126103001@gmail.com/yogeshsingh15@gmail.com/skpandey.nits@gmail.com** on or before **10<sup>th</sup> May, 2019**. The original hard copies of registration form and D.D. has to be submitted at the registration desk, just before the commencement of the workshop.

## REGISTRATION FEE DETAILS

- Internal (NIT Silchar) Students: Rs. 500/-
- External Students: Rs. 700/-
- Internal (NIT Silchar) Faculty members: Rs. 1000/-
- External Faculty members: Rs. 1500/-
- Industry Persons: Rs. 2000/-

The registration fee includes registration kit and lunch. All participants have to pay the registration fees before submitting application either:

- (i) via DD in favor of Director NIT Silchar, Payable at State Bank of India, NIT Silchar branch, or
- (ii) Online transfer to the account of the Director, NIT Silchar (A/C No.: 10521277057, IFSC: **SBIN0007061**, Branch: NIT Silchar).

Brochure and registration form can also be downloaded from: <http://www.nits.ac.in/>

## ACCOMMODATION AND TRAVEL

All the out station participants will be provided accommodation on payment basis in the Guest House/Hostels of the institute. No TA and DA will be paid to the participants.

## HOW TO REACH NIT SILCHAR

There are daily flights from Kolkata, Guwahati. Taxi are available from Airport to NIT Silchar, Silchar is also well connected by road and train from Guwahati.

## ADDRESS FOR COMMUNICATION

**Dr. Yogesh Singh/Dr. Bipul Das**  
Assistant Professor & Workshop Coordinators  
Mobile: +91 7005432924  
Email: [bipul126103001@gmail.com](mailto:bipul126103001@gmail.com)

**Dr. Shivendra Kumar Pandey**  
Assistant Professor & Workshop Coordinator  
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Email: [skpandey.nits@gmail.com](mailto:skpandey.nits@gmail.com)

## FIVE DAYS WORKSHOP ON **Electronic Systems for Mechanical Automation & Robotic Technology** (**eSMART – 2019**)

(**TEQIP III SPONSORED**)

**20<sup>th</sup> May – 24<sup>th</sup> May, 2019**

### Coordinators

**Dr. Yogesh Singh**

**Dr. Bipul Das**

**Dr. Shivendra Kumar Pandey**



*Organized by*

**Department of Mechanical Engineering**

**&**

**Department of Electronics and  
Instrumentation Engineering**

**National Institute of Technology Silchar**

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**Assam, India.**

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**FIVE DAYS WORKSHOP**  
**ON**  
**Electronic Systems for Mechanical Automation & Robotic Technology**  
**(eSMART – 2019)**  
**Under TEQIP III**

**20<sup>th</sup> May – 24<sup>th</sup> May, 2019**

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**Department of Mechanical Engineering**  
**&**  
**Department of Electronics and Instrumentation Engineering**  
**National Institute of Technology Silchar**

**SESSION PLAN**

<b>DATE: 20.05.2019 (MONDAY)</b>			
<b>Time</b>	<b>Session</b>	<b>Speaker</b>	<b>Topic</b>
09.00 AM to 09:30 AM	<b>Registration</b>		
09.30 AM to 10:00 AM	<b>Inauguration Ceremony</b>		
10.00 AM to 10:30 AM	<b>High Tea</b>		
10.30 AM to 12:30 PM	<b>Session I</b>	Dr. Atul Thakur, IIT Patna	Bio-Inspired robotics
12.30 PM to 12:45 PM	<b>Tea-Break</b>		
12.45 PM to 01:30 PM		Mr. Keshava Prakash, Strategi Automation	Galil Motion Controller
01.30 PM to 02:30 PM	<b>Lunch Break</b>		
02.30 PM to 04:15 PM	<b>Session II</b>	Dr. Saurabh Kumar Pandey, IIT Patna	Advances in automation/sensor system
04.15 PM to 04:30 PM	<b>Tea Break</b>		
04.30 PM to 05:30 PM		Mr. Keshava Prakash, Strategi Automation	Compliant Mechanism for Micro-Milling Application
<b>DATE: 21.05.2019 (TUESDAY)</b>			
10.00 AM to 12:00 PM	<b>Session III</b>	Dr. Atul Thakur, IIT Patna	Introduction to mobile robots and sensors and actuators for robotics
12:00 PM to 12:15 PM	<b>Tea-Break</b>		
12:15 PM to 01:30 PM		Dr. Saurabh Kumar Pandey, IIT Patna	Recent Trends and Developments in MEMS Technology for robotic applications

01.30 PM to 02:30 PM	<b>Lunch Break</b>		
02.30 PM to 04:00 PM	<b>Session IV</b>	Mr. Yogendra Srivastava, Director, VSD Enterprises	3D printing challenges and opportunities
04.00 PM to 04:15 PM	<b>Tea-Break</b>		
04.15 PM to 05:15 PM		Dr. Atul Thakur, IIT Patna	Tutorial: Robot motion simulation using MATLAB/Octave
<b>DATE: 22.05.2019 (WEDNESDAY)</b>			
10.00 AM to 12:00 PM	<b>Session V</b>	Mr. Rajendran N, National Instruments	Applications of sensors, actuators in system automation and control
12:00 PM to 12:15 PM	<b>Tea-Break</b>		
12.15 PM to 01:30 PM		Mr. Rajendran N, National Instruments	Hands on session for LabVIEW
01.30 PM to 02:30 PM	<b>Lunch Break</b>		
02.30 PM to 04:30 PM	<b>Session VI</b>	Mr. Rajendran N, National Instruments	Hands on session for LabVIEW
04:30 PM to 04:45 PM	<b>Tea-Break</b>		
04.45 PM to 05:30 PM			Introduction about the facility In Mechanical Engineering and Electronics & Instrumentation Engineering Department
<b>DATE: 23.05.2019 (THURSDAY)</b>			
10.00 AM to 12:00 AM	<b>Session VII</b>	Prof. S. M. Hazarika, IIT Guwahati	Robotics: History, Trends and Future Directions
12:00 PM to 12:15 PM	<b>Tea-Break</b>		
12:15 PM to 01:30 PM		Prof. S. Bhaumik, IEST Shibpur	Electronic system for mechatronics products
01.30 PM to 02:30 PM	<b>Lunch-Break</b>		
02.30 PM to 04:30 PM	<b>Session VIII</b>	Prof. S. M. Hazarika, IIT Guwahati	Machine Learning for Cognitive Capabilities in Robotics
04:30 PM to 04:45 PM	<b>Tea-Break</b>		
04.45 PM to 05:30 PM		Dr. Nabanita Adhikary, NIT Silchar	A novel Control Scheme
<b>DATE: 24.05.2019 (FRIDAY)</b>			
10.00 AM to 12:00 PM	<b>Session IX</b>	Dr. Manidipto Mukherjee, Senior-Scientists, CSIR-CMERI, Durgapur	Advanced Welding Technology for Industry 4.0
12.00 PM to 12:15 PM	<b>Tea-Break</b>		
12:15 PM to 01:30 PM		A session for the discussion and interaction	
01.30 PM to 02:30 PM	<b>Lunch Break</b>		
02.30 PM to 04:30 PM	<b>Session X</b>	Prof. S. Bhaumik, IEST Shibpur	Electronic system for robotics and industrial automation
04.30 PM to 05:30 PM	<b>Valedictory</b>		

## Short Biography about Speakers

### Speaker 1: Dr. Atul Thakur, IIT Patna



**Dr. Atul Thakur**  
Assistant Professor,  
Department of Mechanical Engineering,  
IIT Patna  
Email: [athakur@iitip.ac.in](mailto:athakur@iitip.ac.in)  
Phone: 0612-3028158

Dr. Atul Thakur is an Assistant Professor in the Department of Mechanical Engineering at Indian Institute of Technology Patna. His research interest is broadly in the area of robotics and automation. He has been actively engaged in the research involving the design, motion planning, and control of bio-inspired robots, application of robotics in the area of solid waste management, and selective micromanipulation of biological cells using magnetic Microrobots. He received a Ph.D. degree in mechanical engineering from the University of Maryland, College Park, Master of Technology (M.Tech.) degree in manufacturing engineering from the Indian Institute of Technology Bombay, and Bachelor of Engineering (B.E.) degree in production engineering from the University of Mumbai. Atul is a recipient of the 2013 Best Dissertation Award from ASME–CIE Division. He received Elsevier Journal of Computer-Aided Design 2012 most cited paper award and 2012 NSF funded travel award to attend and present his research work at Performance Metrics for Intelligent Systems (PerMIS'12) workshop. In the past, he won A. James Clark fellowship consecutively from 2007 to 2010. He is also a member of the American Society of Mechanical Engineers (ASME) since 2009 and Institute of Electrical and Electronics Engineers (IEEE) since 2011.

### Speaker 2: Mr. Keshava Prakash V, Strategi Automation Pvt. Ltd.



**Mr. Keshava Prakash V,**  
Design Engineer,  
Strategi Automation Pvt. Ltd., Bangalore  
Email: [keshava@strategiautomation.com](mailto:keshava@strategiautomation.com)  
Mobile: +91-9035392127

Keshava graduated in Mechanical Engineering from Malnad college of engineering and Masters in Industrial Automation and Robotics from the National Institute of Engineering, Mysore, Karnataka. He worked on research projects and secured a patent for one of the project. At Strategi Automation Solution Pvt. Ltd, he started to work as a Design Engineer.

He secured the following awards as Team Strategi:

1. FKCCI (Federation of Karnataka Chambers of Commerce & Industry) MSME Innovations excellence awards - 2017.
2. CII Design Excellence Awards - 2017.
3. FIE Foundation Awards - 2019 at IMTEX 2019.

### **Speaker 3: Dr. Saurabh Kumar Pandey, IIT Patna**



**Dr. Saurabh Kumar Pandey**  
Assistant Professor,  
Department of Electrical Engineering,  
IIT Patna  
Email: [saurabh@iitp.ac.in](mailto:saurabh@iitp.ac.in)  
Phone: 0612-3028246

Dr. Saurabh Kumar Pandey is working as an Assistant Professor and faculty in-charge of Sensor and Optoelectronics Research Group (SORG) in Electrical Engineering department at Indian Institute of Technology Patna since 2015. Prior to this, he was working as Assistant Professor in NIT, Hamirpur Himachal Pradesh and Military College of Telecommunication Engineering MHOW, Indore (M.P.). He received his Engineering degree in Electronics and Communication (RJIT, Gwalior) and M.Tech in Optoelectronics (SGSITS, Indore) from Rajiv Gandhi Technical University, Bhopal, Madhya Pradesh, India, in 2007 and 2009 respectively. He obtained his Ph.D. degree from Electrical Engineering Department, Indian Institute of Technology Indore in 2014. His research interest includes Optoelectronics devices, Semiconductor thin films, Solar cells, Micro-Nanoelectronics, MEMS, Modeling & Simulation. He has 10 years research and teaching experience in several reputed institutes and organizations. He has published more than 50 publications in peer reviewed international journals and conferences. He has worked on design and fabrication of high efficiency blue light emitting diode. Both theoretical and experimental analysis has been done via different sophisticated high end resource facilities. Device/Material parameters have been rigorously investigated for the optimum performance of the LED. Currently, He is working towards, design, modeling and experimental optimization of sensors, solar cells, photo detectors, Memristor etc.

### **Speaker 4: Mr. Yogendra Srivastava, Director, VSD Enterprises**



**Yogendra Srivastava,**  
Director,  
VSD Enterprises, Hyderabad,  
Email: [yogendra@vsd3d.com](mailto:yogendra@vsd3d.com),  
Website: [www.vsd3d.com](http://www.vsd3d.com)  
Contact: +91-9985952208

Yogendra Srivastava is a B.tech in Computer Science and MBA in Marketing from JNTU Hyderabad. He started his career as a sales & technology consultant at EDS technologies Pvt. Ltd. the front runner in 3D Design and analysis software. He has been consulting organisations in their best practices of Design and analysis for the past few years since 2010. In the year 2013 he joined Altem Technologies a Stratasys distributor as a consultant to market products in 3D Printing i.e. Additive manufacturing & Reverse engineering. Having won the best consultant and sales person award from Stratasys, USA for the Indian subcontinent.

He has been helping organisations solve their problems and come up with innovative products using AM & RE for the past 5 years. Have consulted dental labs, defence research laboratories, educational institutes in adoption of technologies suiting to their requirements and solving their real world problems. Have assisted many institutes to setup their Innovation & Entrepreneurship laboratories in Southern India.

### **Speaker 5: Prof. S. M. Hazarika, IITG**



**Prof. Shyamanta M Hazarika,**  
**Mechanical Engineering**  
**IIT Guwahati,**  
**Email:**  
**Phone: +91-9435084468**  
**<http://www.iitg.ernet.in/s.m.hazarika>**

Shyamanta M Hazarika is a Professor of Mechanical Engineering at IIT Guwahati where he leads the Biomimetic and Cognitive Robotics Lab. He holds a BE from Assam Engineering College, Guwahati and an M.Tech from Center for Robotics, IIT Kanpur. He holds a PhD from School of Computing, University of Leeds, England. He has been a Professor of Neuroinformatics at the Cognitive Systems Group, University of Bremen, Germany. Prior to IIT Guwahati, Prof. Hazarika had spent more than a decade at Tezpur University where he founded the Biomimetic and Cognitive Robotics Lab - a group working on cognition and robotics with particular focus on Rehabilitation Robotics. His primary research interest is in Rehabilitation Robotics and Knowledge Representation and Reasoning. This translates into interest in bio-mimetic prosthetics; cognition and cognitive vision.

### **Speaker 6: Prof. S. Bhaumik, IEST Shibpur**



**Prof. Subhasis Bhaumik,**  
**Dean (R&C),**  
**IEST Shibpur,**  
**Email: [subhasis@aero.iests.ac.in](mailto:subhasis@aero.iests.ac.in),**  
**Phone - +91-9836044278**

Dr. Subhasis Bhaumik did his B.E in Mechanical Engineering and M. E. in Production Engineering. After post-graduation he joined in TATA STEEL – Jadavpur University joint research project for development of a robotic system for steel plant application. He did his Ph.D in the area of robotics. Dr. Bhaumik is currently working as Professor and Former Head of the Dept. of Aerospace Engineering, Indian Institute of Engineering Science & Technology Shibpur. He was also Head of School of Mechatronics & Robotics in IEST Shibpur. His research interest is Bio-robotics, Bio-mechatronics, Smart Material, CAD/CAM/Industrial Automation, Assistive Devices, Innovative Product Development and BCI/HMI. Dr. Bhaumik is the principal investigator of sponsored projects of Indo-US Fabrication, BRNS-BARC, DST, AICTE, UGC, Larsen & Toubro, IE(I), DST-FIST and DIC - National Initiative on Design Innovation (MHRD). He has published more than 70 research papers in SCI journals, book chapters and International and National conferences. Two innovative products have been filed for patent. He is a Fellow of Institution of Engineers (I), member of Association of Machines and Mechanism, Robotics Society of India and Expert Member - Rehabilitation Council of India. Dr. Bhaumik is now acting as Dean (Research & Consultancy), IEST Shibpur.



**Speaker 7: Dr. Manidipto Mukherjee, Senior-Scientists, CSIR-CMERI, Durgapur**



**Dr. Manidipto Mukherjee,  
Senior-Scientists,  
Advanced Manufacturing Division,  
CSIR-CMERI, Durgapur  
Email: m.mukherjee.ju@gmail.com  
Phone: +91-9933564452**

Dr. M. Mukherjee received his B. Tech. degree in Mechanical Engineering from the West Bengal University of Technology, West Bengal, India, in 2009. He received his M. Tech. degree in Welding Technology and Materials Engineering and Ph.D. degree in Welding Metallurgy and allied processes from the Jadavpur University, Kolkata, India, in 2011 and 2016, respectively. In 2016, he joined the Department of Mechanical Engineering, C.V. Raman College of Engineering, Bhubaneswar as an Assistant Professor. In August 2017, he joined the Department of Mechanical Engineering, SRM Institute of Science and Technology, Chennai, as a Research Assistant Professor. Since, May 2019, he has been associated with the Advanced Manufacturing Division, CSIR-CMERI, Durgapur where he is a Senior Scientist. His current research interests include Advanced Manufacturing, Welding and Joining, Fluid Flow Behaviour, Modes of Metal Transfer, Microstructural and Mechanical Characterization of Metals and Alloys, Statistical Methodologies, High Cycle Fatigue and Fracture, Corrosion Behaviour of Metals and Alloys, Material Processing and Alloy Design. Dr. Mukherjee is a life member of Indian Institute of Welding from July 2015 and an AMIE of Institution of Engineers (India) from August 2018. He was the recipient of the CSIR-SRF award of the Govt. of India in 2012, the Venus Wire award, I.T. Mirchandani Memorial Research award, D & H Secheron award and ESAB India award of the IIW-India for his outstanding contributions to the field of welding technology and development in 2013, 2014, 2015 and 2016 respectively. He is also a recipient of DST-ECR award in 2019. Dr. Mukherjee published 20 research papers/articles, till date, in several international journals of high repute along with more than a dozen of papers presented in several international and national conferences.

**Workshop Coordinators:**

Dr. Yogesh Singh & Dr. Bipul Das

Assistant Professor, Department of Mechanical Engineering,

Dr. Shivendra Kumar Pandey

Assistant Professor, Department of Electronics & Instrumentation Engineering

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