

INDIAN INSTITUTE OF TECHNOLOGY (BHU)  
(Varanasi- 221 005, UP-INDIA)

**A NATIONAL SYMPOSIUM on  
Miniature Manufacturing in 21<sup>st</sup> Century**  
(August 16-18, 2013)  
(Registration form)

Name:  
Position:-  
Department:-  
Institution/Organization:-  
Address:-  
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Telephone No.-: Fax No.-:  
Educational Background (starting from B.E./B.Tech):

Degree	Field of Specialization	Institution	% marks/ CGPA/CPI	Year
B.E./B.Tech.				
M.E./M.Tech.				
Ph.D.				

Areas of Research Interest: \_\_\_\_\_

Accommodation Required (Hostel/Guest House)  
(Charge will be Notified on the Website Later)

Payment details:

Only Cash Deposit or Online Transfer  
NEFT Transfer no. \_\_\_\_\_ dated \_\_\_\_\_  
Amount in Rs. \_\_\_\_\_ drawn at \_\_\_\_\_

Recommendation

Signature of applicant

Signature of Head of the Department  
/ Head of the organization.

**Note:** The scan copies of completely filled form and  
Payment receipt must be send through email to  
nsmmic2013@gmail.com or contacts@nsmmic2013.biz.

### ADDRESS FOR CORRESPONDENCE

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Dr. Rajnesh Tyagi (Treasurer)  
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### HOW TO REACH IIT (BHU) VARANASI

After getting down at Varanasi Cantt. railway station, take  
exit from platform no. 1 and hire a taxi or an auto to IIT  
(BHU) Campus. The fare is about:

Cantt. Station to IIT Campus: Rs. 150-200/- .  
From Airport to IIT Campus : Rs . 800-1000/-

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A  
NATIONAL SYMPOSIUM  
on

### Miniature Manufacturing in 21<sup>st</sup> Century

(NSMMIC - 2013)  
August 16-18, 2013

Coordinators: **Dr. Santosh Kumar**  
**Dr. V. K. Suri**  
**Dr. R. Balasubramaniam**



भाभा परमाणु अनुसंधान केंद्र  
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**Organized by**

Department of Mechanical Engineering  
**INDIAN INSTITUTE OF TECHNOLOGY (BHU)**  
**Varanasi- 221 005 (UP)**

<http://www.nsmmic2013.biz>

## ABOUT THE COURSE

A National Symposium on 'Miniature Manufacturing in 21<sup>st</sup> century' will be offered from August 16 to 18<sup>th</sup>, 2013, under Department of Mechanical Engineering, I.I.T. (BHU) Varanasi. The symposium is sponsored by Bhabha Atomic Research Centre, Mumbai and will be specifically useful for persons who are concerning training/ teaching, research, and industrial applications of miniature manufacturing involving micromachining, micro/nano finishing, micro-forming, micro-molding, micro-welding, and micro-casting, micro/nano metrology and societal engineering etc. The symposium would be a forum for participants and expert for discussions on the topic from experienced peoples from IIT's/NIT's and DAE, aerospace, automotive, optical, biomedical and similar others.

## OBJECTIVE

21<sup>st</sup> century is the technology of miniature manufacturing wherein, meso and micro manufacturing have been emerging as an important technology specially in the areas where miniaturization yields economic and technical benefits, namely, DAE, Aerospace, Automotive, Optical, Biomedical and similar other areas. The miniature manufacturing processes can be applied to metallic as well as non-metallic materials.

With the advent of computer numerical control and direct numerical control, resolution, accuracy, uniformity and repeatability of the machined parts have improved and manufacturing has gained the flexibility. In recent time, the miniaturization of the machines and devices is leading to the demand of parts with dimensions of the order from 1mm to a few hundred micrometers. Scientists and researchers are engaged in developing even the nano featured products such as NEMS (Nano Electro Mechanical System). It is therefore, quite safe to say that there is a need to have the miniature manufacturing processes, that is capable of dealing with micro to atomic and molecular dimensions. Hence, such processes come under the category of miniature / $\mu$ -manufacturing.

The demand of industries for miniature manufacturing of various types of materials (metallic, ceramics and plastics) is increasing day by day. Chinese products market is an example. Miniature parts have applications in various industries like electronics, medicine, communication, avionics and others. Some of the examples of the products that require  $\mu$ -manufacturing are micro holes in fiber optics, micro nozzles for high temperature jets, micro molds etc. Conventional methods (turning, drilling, etc.) with modified versions have been employed for  $\mu$ -machining of various types of materials.

In case of advanced machining processes, material is removed at micro level either by mechanical means (USM, AJM, MAF), thermal erosion (EBM, LBM), anodic dissolution (ECM), chemical reaction or combination of two or more than two processes, called as hybrid machining.  $\mu$ -machining can be placed in the group of precision machining and ultra precision machining.  $\mu$ -machining can be divided into two categories like bulk  $\mu$ -machining where comparatively large amount of material is removed when compared with surface  $\mu$ -machining where the objective is just to improve surface finish in the sub-micron range. The Surface roughness values obtained by these processes have been reported as low as the size of an atom or even a fraction of the size of an atom. To measure surface roughness under such cases (low values of surface roughness), atomic force microscope is the latest equipment used to measure such a low value of surface roughness.

The basic objective of the present national symposium is to acquaint the participants with the principles, basic process and machine tools, developments in the miniature manufacturing process, and research trends in the area of micro/ nano manufacturing process. Thus, The national symposium will deal with various aspects of miniature manufacturing including measurement techniques etc.

## COURSE CONTENTS

- Introduction to MINIATURE MANUFACTURING
- Traditional Micromachining  
Micromilling, Microturning, Microgrinding.
- Advance (Micro / Nano) Machining  
Mechanical Micromachining (AJM, USM, etc.), Thermal Micromachining (EDM, LBM, EBM, etc.), Electrochemical and Chemical Micromachining, Ion Beam Machining, Photochemical Etching, Biomachining.
- Micro/Nano-finishing  
Abrasive Flow Finishing, Magnetic Abrasive Finishing, Magnetorheological finishing, etc.
- Microforming  
Micro-Sheet Forming, Micro-Laser Forming, etc.
- Microjoining Technology  
Laser Beam Micro welding/ Micro joining, Electron Beam Micro welding/Micro joining, etc.
- Microfabrication
- Microcasting.
- Microsensors/Microactuators,
- Measuring techniques in Miniature Manufacturing & Finishing etc.
- Societal Engineering.

## FACULTY

Speakers will be from various disciplines of different IITs/ Research Organizations and other institutions of higher learning, and related industries and R&D organizations from different parts of the country.

## COURSE FEE

Private and public sector industries, R&D Centers/ Laboratories, teaching Institutions and other organizations are welcome to depute their executives, managers, teachers and engineers to participate in the national symposium.

The sponsoring organization is/are exempted to pay any fee. The non-sponsoring organizations are required to pay a registration fee of Rs.8,000/- per participant (Including Kit + Meal + proceeding). Faculty members working in Central/State Govt. Institutions/Universities : Rs. 3000/- per participant (Including Kit + Meal + proceeding). Faculty members working in Private Institutions/University : Rs. 4000/- per participant (Including Kit + Meal + proceeding). Research Scholars/ Students : Rs. 2000/- per participant (Including Kit + Meal + proceeding). The accommodation in Institute guest house/hostel will be available on first-come first basis and charges will be as per the rate of Guest House/Hostel. Application may be submitted along with refundable caution fees (Rs. 500/-) through Internet Transfer/NEFT.

## MODE OF PAYMENT

The registration fee/ refundable caution money deposit should be deposited by cash or online transfer to the following account No.

Bank Details for NEFT / Online Transfer:  
Beneficiary Name : NSMMIC 2013  
Bank Name : State Bank India  
Bank Address : IT branch BHU, Varanasi  
Account No. : 33014661188  
Account Type : Current  
IFSC Code : SBIN0011445

The details/receipt of the deposit/transfer must be sent online to coordinator through online registration form.

The list of the selected candidates will also be displayed on following website

<http://www.nsmmic2013.biz>