नैनो विज्ञान एिं प्रौद्योविकी संस्थान
(विज्ञान एिं प्रौद्योविकी विभाि, भारत सरकार का एक स्वायत्त संस्थान)
Institute of Nano Science and Technology
(An Autonomous Institute supported by Department of Science and Technology, Government of India)

No. 9(1)/2023-INST Dated: 21.02.2023

# Ph.D. PROGRAM - August 2023 SESSION

Institute of Nano Science and Technology (INST), Mohali invites applications from prospective candidates for admission into its Ph. D. Program in several areas of nanoscience and nanotechnology for the session beginning in August 2023. Selected students will be provided fellowship as per the norms of INST and Government of India. **Students with an independent source of fellowship, for example CSIR/UGC-JRF, are also encouraged to apply**. Selected students will be enrolled in the Ph. D. program of Indian Institute of Science Education and Research (IISER), Mohali and the Ph. D. degree will be awarded by IISER, Mohali.

The major ongoing research areas at INST are given at the end of this document.

## a) ELIGIBILITY

- M. Sc. or M. Pharm. or M. Tech. in Basic or Applied Sciences, Engineering or related areas. Students who have appeared for the final year/semester examinations are also eligible, provided that the degree will be granted by the time of joining.
- Qualified at least one national examination out of GATE, CSIR/UGC-NET, JEST, JGEEBILS (TIFR/ NCBS), ICMR-JRF, DBT-JRF, DST-INSPIRE or GPAT.
- Age limit: As per the guidelines of CSIR-UGC and DST.

## b) APPLICATION & SELECTION PROCEDURE

- Candidates must submit application in the prescribed format available at https://inst.ac.in/careers/42.
- In addition to the above application, the candidates are required to submit an online synopsis (click here: https://forms.gle/SQqsy1vncxARy3dW7).
- A hard copy of application (affixing a recent passport size photograph) along with the self-attested copy of certificates proving age, educational qualifications, experience (if any) and reservation category should be sent to "The Director, Institute of Nano Science and Technology, Knowledge City, Sector 81, Mohali 140306 (Punjab). The envelope containing the application form should be super scribed as "Application for the Ph. D. Program –August 2023".
- Eligible candidates will be shortlisted for interview and the date and mode of interview will be communicated to the email address provided by candidate. The list of shortlisted candidates will also be uploaded on INST website.
- Ph. D. interviews will be conducted in person and the candidates called for interview will be not be paid any TA/DA.
- After the interview, the list of candidates selected for Ph. D. will be uploaded on INST website and the candidates will be intimated by email.
- The candidates are advised to visit INST website frequently to track the latest developments.
- Selection of students shall be done as per the provisions of The Central Educational Institutions (Reservation in Admission) Act, 2006 and amendments made thereto.
- Number of students required for admission ST (4), SC (7), OBC (13), EWS (6), and GEN (25).

## c) APPLICATION FEES

- **Rs.590/-** for General, OBC and EWS candidates, and **Rs.295/-** for SC, ST and PH candidates.
- Application fees may be transferred
- online to the bank account of INST noted below. Full name of the applicant shall be mentioned as the purpose of transaction. The details of the online transaction should be attached along with the application.

**Account Name:** Director, INST Mohali **Account number:** 2452201001102
**IFS code:** CNRB0002919 **Bank:** Canara Bank, SECTOR-64, PHASE 10, MOHALI-160062

## d) LAST DATE

- The duly filled applications along with the supporting documents should reach INST through Registered/ Speed Post/ Courier/ By Hand on or before **15th March 2023. [ Extended from 15th March to 29th March 2023]**
- Applications received after the last date shall not be entertained in any case.

# Research Units at INST

## Chemical Biology

***Cancer Nanomedicine***
- Epigenetic based
- Hyperthermia based
- Photo-thermal therapy
- Photo-therapy
- Combinatorial nanomedicine approach

***Nano-therapeutics***
- Infectious diseases: tuberculosis, leishmaniosis
- Neurodegenerative diseases: Alzheimer's disease, Parkinsonism
- Lifestyle diseases: rheumatoid arthritis, osteoarthritis
- Autoimmune disease: ulcerative colitis

***Bio-mimetic and Tissue Engineering***
- Regenerative nanomedicine
- Stem cell nanomedicine
- Supramolecular nanomaterial scaffolds
- Smart hydrogels
- Hybrid organic-inorganic nanomaterials

***Biomolecular Phenomenon at Nanoscale***
- Disease mechanism
- Self-assembling bio-nanomaterials
- Nano-confinements
- Biological nano-machines

***Nano-diagnostic***
- Biosensors: SERS, electrochemical or fluorescence based techniques
- Theranostics: biomaterials for theranostics

***Agri-nanotechnology***
- Nano-fertilizers
- Nano-pesticides

***Nano-toxicology***
- Cell and tissue toxicity
- Nanomaterial toxicity
- Developmental, neurological, behavioural nano-toxicity

## Energy & Environment

***Inorganic & Materials Chemistry***
- Anti-counterfeiting
- $CO_2$ sequestration
- Electrochemical $NH_3$ and urea synthesis
- Electrochemistry of nanomaterials
- Energy storage & conversion (fuel cells, batteries & supercapacitors)
- Framework materials (COF & MOF)
- Molecular magnetism & Single molecule magnets
- Molecular spintronics
- Photocatalysis (water splitting & $CO_2$ reduction)
- Sensing
- Solid state chemistry
- Spin-selective electron transport
- Waste management
- Water & air purification

***Organic & Polymer Chemistry***
- Biomaterials & Drug delivery
- Catalysis (organic transformations, photocatalysis, biomass conversion)
- Chemosensors
- Flexible optoelectronics
- Luminescent materials
- Microfluidics
- Nanomotors & Micropumps
- Small molecule & Polymer synthesis
- Stimuli-responsive supramolecular materials
- Synthetic methodology

***Spectroscopy & Physical Chemistry***
- Biosensing
- Device fabrication
- Luminescence spectroscopy
- Nanophotonics
- Optical thermometry
- Single molecule spectroscopy
- Ultrafast spectroscopy
- X-ray scattering

## Quantum Materials & Devices

***Experimental aspects of Material and Device Physics***
- Low dimensional materials and artificial superstructures
- Nanoscale piezo, ferro and pyro-electricity
- Photovoltaics
- Micro and nano structured device
- Nano devices and sensors
- Spintronics
- Organic-inorganic hybrid nanostructured devices, self-powered electronics, sensors and actuators
- Flow fabrication of nanostructures for light driven properties
- Microfluidics for sensing and delivery
- Physics in Nanodimension objects

***Computational Nanoscience***
- Theoretical condensed matter physics
- Exploiting piezoelectricity, electronic charge, spin and valley degrees of freedom at the nanoscale for next-generation electronics
- Nanomaterials and their interfaces for power conversion: e.g., photovoltaics, photocatalysis, sensors
- Designing of spin-interfaces and spintronics materials
- Single molecule magnets and molecular magnetism

***Computational Chemistry***
- Electron transfer in proteins & enzymatic chemical reactions
- Electron transport at molecular nano-junctions

***Computational Biology and Biophysics***
- Molecular Dynamics Simulations of Protein and Protein-Ligand Interactions
- Anti-malarial drug activities and drug designing
- Regulation of enzymatic activities of CBS enzymes

Further details are available at www.inst.ac.in