

# INDIAN INSTITUTE OF TECHNOLOGY DELHI HAUZ KHAS, NEW DELHI-110016

ADVERTISEMENT NO. IITD/2023/PDF-2

## ADVERTISEMENT FOR THE POSITION OF POST DOCTORAL FELLOW

IIT Delhi invites applications from qualified persons for the position of **Post-Doctoral Fellow (PDF)** in its various academic units to promote inter-disciplinary research activities, strengthen research ecosystem of the Institute and groom potential faculty members.

### Who can apply?

- Indian Nationals of General/SC/ST/OBC-NCL/PWD/EWS category as well as with physical disability.

### Minimum Eligibility Criteria:

#### 1. Age Limit:

Maximum age of candidate is 32 years (for male) and 35 years (for female). Age relaxation for reserved candidates as per Govt. of India guidelines as follows: SC/ST – 5 years, OBC-NCL – 3 years, EWS – No age relaxation, General PwD – 10 years.

For exceptional candidate to be recorded in writing.

#### 2. Educational Qualification:

- a) Ph.D. with First class or equivalent grade in preceding degree with consistently good academic record.
- b) Candidates who have submitted their Ph.D. thesis and have not yet defended it can be considered subject to the submission of a certificate from the guide duly forwarded by the Head of the Department of their Institute. This certificate must be provided at the time of the interview.
- c) In case of (b) above, before the first assessment of the PDF at the end of first year tenure, he/she should have completed the Ph.D. defense which is mandatory for the candidate to continue for the second year, else the contract gets terminated and no representation will be entertained.
- d) PDF posts are primarily for external candidates only and in case IIT Delhi Ph.D. degree holders have to be considered, it may be done, only 3 years after obtaining their Ph.D. degree from IIT Delhi.

#### 3. Publications:

- Candidates should have demonstrated research capabilities in terms of publication in reputed journals and conferences.

#### 4. Remuneration & Benefits:

- Fellowship of Rs. 75,000/- per month plus House Rent Allowance (HRA) at the Govt. of India rate for New Delhi. No Institute accommodation will be provided.
- Professional Development Allowance (PDA) of Rs. 1.00 lakh per financial year (April-March) will be available from the date of joining the institute. For PDF serving for shorter period, proportionate amount shall be granted. Unutilized PDA can be carried forward to the next financial year. Utilization of PDA is restricted to attending conferences (both national and international).

## **Duties & Responsibilities:**

- To perform scholastic research in cutting-edge areas of academic units and support teaching activities by assisting in practical's and tutorials. PDF should be attached to a research group, not to an individual faculty. PDFs are expected to publish research articles with IIT Delhi affiliation in peer-reviewed scientific journals and present research work at reputed conferences. They are also expected to supervise Ph.D. and Post-graduates in their project work and assist the mentor in writing project proposals.

## **Tenure of Appointment:**

- Initially for one year (on contract), which can be extended for another one year on same T&C based on assessment of performance. There can be extension of contract after completion of 2 years for outstanding candidates. The extension after 2 years and its duration will be decided by the evaluation committee on the basis of the performance of the PDF.

## **Academic Units and their Specializations/Research Areas:**

### **Academic Units: -**

1. **APPLIED MECHANICS:** Solid mechanics, Fluid mechanics, Design engineering and interdisciplinary areas of mechanics including but not restricted to Biomechanics, Nanomechanics, Nonlinear dynamics and reduced order modeling, Multifunctional materials and structures, Structural health monitoring, Soft robotics, Machine learning in mechanics, Higher order computational methods, High speed compressible flows, Two-phase flows, Environmental fluid flows, Granular flows, Thermocapillary flows, Solid-fluid interactions, Naval Architecture, etc.
2. **BIOCHEMICAL ENGG. & BIOTECHNOLOGY:** "Bioprocess and metabolic Engineering (Enzyme bioreactors, Bio-separation Engg with specialization in Chromatography and Nano-filtration, Genome Engineering), Systems and Computational biology (Quantitative biology, Synthetic biology) and Molecular biology of disease, Diagnostics and Bionanotechnology (Nano-biosensors, Therapeutics/drug delivery)".
3. **CHEMICAL ENGINEERING:** All areas of Chemical Engineering.
4. **CHEMISTRY:** All Areas of Chemistry.
5. **CIVIL ENGINEERING: ENVIRONMENTAL:** Solid and Hazardous Waste Engg, Air Pollution Control Engg, Water and Waste Water Engg. **GEOTECHNICAL:** Geotechnical Engg., Geo-environmental Engg., Rock Mechanics and Rock Engg.; **STRUCTURES:** Structural Engg., Construction Materials, Construction Management, including project Management. **TRANSPORTATION:** Transportation and Traffic planning, Transportation and Traffic Engg., Pavement Engg.; **WATER RESOURCES:** All the areas of Water Resources Engg, including Hydrology, Hydraulics, Ground Water, Remote Sensing. **NOTE: The candidate should have B.E./ B.Tech. or equivalent degree in Engineering with Ph.D in the relevant area.**
6. **COMPUTER SCIENCE & ENGINEERING:** High Performance Computing and Visualization, Machine Learning and Artificial Intelligence, Wired and Wireless Networks, Mobile Computing and Machine-to-Machine, Algorithms & Complexity, Logic & Verification, Information Management, Data Science & Big Data, Computer Vision, Graphics & Robotics, Programming Languages, Semantics, Analysis & Language Implementation, Distributed & Multicore Computing, Cloud Computing, Cryptography and Systems & Information Security, Human Computer Interaction, Embedded Systems, Computer Architecture, VLSI and EDA.

- 7. DESIGN:** We are looking for candidates specializing in all areas of design such as industrial design, communication design, interaction design, and other relevant design domains. Candidates should have research interest(s) in one or more of the following areas: Creativity, Culture & Design, Neuro-cognition of Creativity, User Experience Design, Information Design, Product Design, Computer-Aided Design, Design of Medical and Assistive Devices, Visual Communication, Filmmaking, Animation, Digital Media, Game Design, Cultural Construction, Design Research, Human Factors and Ergonomics, Sedentary Behaviour and Health, Inclusive Design, Environmental Design Research, Body-Conscious Design, Social and Cultural Factors in Design, Design for Health and Wellness in the Built Environment, Data Driven Design, Mechatronics, Engineering Design, Design for Energy Efficiency, Human-Computer Interaction, Design for Emotion and Persuasion, Design for Usability, Behavioural Design, Design for Human Development, Design for Base of the (economic) Pyramid, Social Innovation, Design Creativity and Innovation, Design Theory and Methodology (incl. Design Thinking), Virtual Reality, Artificial Intelligence in Design, New Product Development, Comics Studies, Illustration, Graphic Design, Designing for Children, Transportation Design, Design for Sustainability, Design Sketching, Design Innovation.
- 8. ELECTRICAL ENGINEERING:** **1.** All research areas of Electrical Engineering including Integrated Electronic Devices & Circuits, Control & Automation, Communication, Signal Processing, Computer Technology, Power Systems, Power Electronics, Machines & Drives. **2.** Computer Technology: Computer Networking, Computer Architecture, SoC and VLSI design and testing, Sensor Networks, Embedded Systems, Parallel and Distributed Processing, Big Data Analysis, CAD for VLSI, Computer Vision and Image Analysis, Biometrics, Pattern Recognition, Machine Learning, Data Analytics, Neural Networks, Artificial Intelligence and Soft Computing, Multimedia Systems, Graph Theory, Systems Biology, Bioinformatics, Medical Informatics, Computational Linguistics, and Music and Audio Processing, Biomedical Signal/Image processing, Assistive Technology, Computational Neuroscience, Brain Computer or Human machine interface, Medical Electronics/Healthcare Technology, Cyber Security, Cyber-Physical Security. **3.** Semiconductor Devices, Materials, Fabrication, Characterization, VLSI Design, Photonics, Mixed-Signal Circuit design, RF Circuit design, NEMS, Neuromorphic, Nano electronics, Nonvolatile Memory Technologies, SRAM, DRAM, Quantum- Materials, Electronics and Computing, Photovoltaics, Sensors, Plasmonics, Compact modelling, Spintronics, MEMS, Analog Circuit Design, Circuit Testing, Fault-Tolerance, Fail-Safe Design, Microelectronics and Power Devices, Circuit Device Interaction, Circuit Device Optimization, 3D ICs, 3D Chips, Advanced semiconductor packaging, device reliability, Flexible and printable electronics, IR photodetectors, chemical sensors, energy harvesters and storage, optoelectronics, power semiconductor devices and wide-bandgap semiconductors, quantum materials, Biosensors, Biomedical devices, Nanofabrication, Growth and self- assembly of novel optical & electronic materials, Integrated nano-scale systems, Computational electromagnetics, Sensors : fiber-optic & chip-based, Biophotonics and bioimaging, Solid State Imaging, CMOS image sensors, Bioinspired vision systems, Neuromorphic Imaging, Analog/Digital circuit design, Optoelectronics and Photonic, Modeling and characterization of Silicon based qubits and CMOS at cryogenic temperatures for quantum computation, RF-CMOS devices and circuits, Reliability of CMOS and GaNHEMT devices, Radiation effects in CMOS, Semiconductor Hardware Security, Microfluidics, Plastic MEMS, Microplasmas, Gas Phase Nanofluidics, Specialized hardware for Artificial Intelligence (Neuromorphic Computing), Nanomagnetism and Spintronics, Computational Neuroscience, Quantum Computing for Artificial Intelligence/ Machine Learning, Micro-magnetic Devices, analog and Mixed signal circuit design, Data Converters (ADC and DAC), Phase locked loop (PLL) and Clock synthesizers, High speed circuit design, Low voltage circuit design, Nanorobotics, Electromagnetic Medical Devices and Implants, Nanofabrication, MEMS, Terahertz devices, Electronic devices and sensors, CMOS analog/RF/mm-wave integrated circuits & systems, CMOS cryogenic integrated circuits & systems for quantum computers, Device thermal reliability. **4.** Power Electronics and Machine Drives: All research areas in PEEMD including High Power Density Converter Design, Fast Chargers for EV, EV Power-Train Design, Solid State Transformer based Traction Converter, HVDC Technology, MMC Topology and Control, DC-DC Converters, Converter Design for POL/Data Centre

Applications, High Frequency Transformer, Renewable Energy Systems, Active Filter for Power Quality Improvement, Non-linear Control Techniques in Power Electronics, Motor control for Induction motor, PMSM, PMLDC etc. **5.** Smart grids, Electricity Markets and Deregulation, Power System Optimization, Modeling and control of Renewable Energy Systems, Vehiclegrid interaction, Demand side management, Adaptive Protection, Distributed Generation, Policy and Regulatory reforms in Electricity Sector, Wide area monitoring protection and control, Realtime simulation of power systems, SCADA, Hardware/Controller-in-loop simulations, Cybersecurity in power systems. **6.** Communications: Wireless Communications, 5G, beyond 5G and 6G, energy efficient signaling techniques, LPWAN, Massive machine typecommunications, grant-free access, backscatter communications, intelligent reflecting surfaces, Internet-things (IoT), energy harvesting, non-orthogonal multiple access, **7.** Signal Processing: EEG Signal Processing, Brain Source Localization, BCI for softexosuit/exoskeleton, silent communication (leaps/EEG/Air-writing) **8.** Application areas: Healthcare, genomics, smart sensors and systems, wearables, green technologies. **9.** Fundamental and applied mathematics relevant to research inElectrical Engineering. **10.**Fundamental and applied areas of physics, chemistry, and life sciences relevant to research in Electrical Engineering. **11.**Interdisciplinary areas relevant to the areas listed above

- 9. ENERGY SCIENCE & ENGINEERING:** Electrical Power Systems, Experimental Plasma Science and Technology, Internal Combustion Engines, Photovoltaic Devices and Systems, Solar Thermal Technology, Energy Storage.
- 10. Humanities & Social Sciences:** Economics, Literature, Linguistics, Psychology, Philosophy, Sociology.
- 11. MANAGEMENT STUDIES:** Operations & Supply Chain Management, Marketing Management, Strategic Management, Technology Management, Telecom Systems Management, Human Resources Management, Organizational Behaviour, Organizational Studies, Corporate Law, Finance, Economics, Information Systems, Business Analytics - Big Data/Natural Language Processing/ Deep Learning/AI, Digital Transformation- IoT / Blockchain / Information Security Management, Entrepreneurship.
- 12. MATERIAL SCIENCE & ENGINEERING:** Metals, glass and ceramics, polymers, computational materials science, functional materials.
- 13. MATHEMATICS: Pure Mathematics:** Algebra, Dynamical System, Harmonic Analysis, Functional Analysis, Number Theory, Coding Theory, Cryptography, and Topology; **Applied Mathematics:** Numerical and Scientific Computing, Matrix Theory, Partial Differential Equations, and Wavelets and Applications; **Statistics and Operations Research:** Queuing Theory, and Optimizations; **Computer Applications:** Graph Theory, Statistical Classification and Clustering, Semantics and Language, Algorithms, and Combinatorics.
- 14. MECHANICAL ENGINEERING:** All areas of Design and Production and Industrial Engineering– Operations Research & Analytics. Further, areas around Thermofluids systems covering theoretical, computational and experimental fluid mechanics, heat & mass transfer, refrigeration & air-conditioning and combustion and their applications to materials, processes, energy and environment. This includes conventional as well as emerging areas such as microscale fluid flow and heat transfer; fluid-structure interaction; energy storage; water purification etc. These areas are only indicative may apply where preference will be given to candidates working in emerging areas and those who can enhance the current strength of the thermofluids group within the department.
- 15. PHYSICS:** Experimental and Theoretical Condensed Matter Physics, High Energy Physics, Plasma Physics, Physics of Quantum Matter, Optics and Photonics, Atomic and Molecular Physics.

- 16. TEXTILE AND FIBRE ENGINEERING:** Textile Engineering, Textile Technology, Textile Chemistry, Fibre Science & Technology, and other Engineering and Sciences (Such as Civil, Mechanical, Chemical, Electrical/Electronics, Materials, Polymers, Mathematics, Physics, Chemistry, Bio-Sciences and Management) with demonstrated research experience in areas relevant to textiles and fibres.
- 17. APPLIED RESEARCH IN ELECTRONICS (CARE):** Microwaves and RF: Microwave components & Systems up to THz, active and reconfigurable antennas and antenna arrays, non-linear device modelling and MMIC, RFIC and RFMEMS; Microelectronics: MEMS and Microsystems, Micro sensors development for defense and space applications, High speed electronic devices and circuits, Quantum Electronic devices for Quantum Information Technology. Signal Processing: Underwater and Air Acoustics, Speech and Audio, Communications, Sensor Arrays, Multi-sensor Data Fusion, Machine Learning; Multi-disciplinary: Modern Radar Systems.
- 18. CENTRE FOR ATMOSPHERIC SCIENCES:** "All areas of Atmospheric and Ocean sciences, candidates with expertise in atmospheric observation are particularly encouraged to apply. More details about CAS are available here: <https://cas.iitd.ac.in/>. All areas of Atmospheric and Oceanic Science".
- 19. CENTRE FOR AUTOMOTIVE RESEARCH AND TRIBIOLOGY (CART):** Power Electronics for EV applications, Battery management systems and other storage technologies for EVs, EV charging infrastructure and smart charging solutions, Vehicular Telematics and Embedded system for EVs, Connected and Autonomous EVs, Vehicle dynamics and control. Condition Monitoring of EV Components and automotive NVH.
- 20. BIOMEDICAL ENGINEERING (CBME):** All areas of Biomedical Engg.
- 21. Transportation Research and Injury Prevention Centre (TRIPP-C):** Statistical modelling of road safety, traffic simulation, air and noise pollution, traffic emissions, freight modelling and its safety, walking and cycling, public transport, travel physical activity, safety of vulnerable population (children, elderly), demand modelling, network optimisation, equity and justice in transport, resilience and reliability, emerging big data, connected and automated vehicles, driving simulators, and driver distraction, impact biomechanics and crash reconstruction.
- 22. CENTRE FOR AUTOMOTIVE RESEARCH AND TRIBIOLOGY (CART):** Power Electronics for EV applications, Battery management systems and other storage technologies for EVs, EV charging infrastructure and smart charging solutions, Vehicular Telematics and Embedded system for EVs, Connected and Autonomous EVs, Vehicle dynamics and control. Condition Monitoring of EV Components and automotive NVH.
- 23. Centre for Sensors, Instrumentation and Cyber-physical System Engineering:** Candidates must have a strong academic and research background, and a proven/ demonstrated history of hands-on product and prototype development in the following priority areas:

*Optical Engineering* and all related/allied areas including Holographic microscopy, Optoelectronic sensing, Computational imaging, Optical metrology, Diffractive and Micro-optics, Aspheric and freeform optics, Optical instrumentation, Optical Coherence Tomography, Laser Based Solid State Lighting, Visible Light Communications, Quantum Technology/Devices in Sensing/Computation/Signal Processing, Advanced optical fabrication technologies, Composite and

nano-materials, optical design, precision optical metrology, optical system engineering, micro and diffractive optics, wavefront sensing, adaptive optics, Nano-optics and nanophotonics, optical remote sensing, Holography and interferometric imaging, Digital Holography, Non destructive testing, spectroscopic instrumentation, Composite and nano-materials, Optical 3-D imaging with emphasis on biomedical application, optical metrology, design and development of opto-electronic/electro-optic sensors.

*Electronics Systems and instrumentation* and all related/allied areas including Nondestructive Testing, Infrared Imaging, Industrial Imaging, Nano-electronics Based Sensors, Electronic circuit design (analog and digital), microprocessor/microcontroller based product design and testing, signal conditioning, applied signal processing for instrumentation.

*Cyber-physical systems* and all related/allied areas including sensor networks, IoT, Embedded Systems.

24. **NATIONAL RESOURCE CENTRE FOR VALUE EDUCATION IN ENGINEERING (NRCVEE):** All areas of Value Education in Engineering.
  
25. **OPTICS AND PHOTONICS CENTRE:** Optical Engineering, Optical Imaging, Fiber Optics, Integrated Optics, Optical Sensors, Silicon Photonics, Nanophotonics, Plasmonics, Biophotonics, Green Photonics, Quantum Optics, Ultra-fast optics, Optical Metamaterials, Nonlinear Optics, Photonic Devices, and other relevant areas.
  
26. **AMARNATH & SHASHI KHOSLA SCHOOL OF INFORMATION TECHNOLOGY (ANSKSIT):** All areas of Information Technology.
  
27. **School of Public Policy :** (i) **Agriculture, Food and Water:** Research on social, institutional and policy processes utilizing technological interventions or affecting technological change in the agriculture, food and water sectors for economic development, environmental sustainability and public health; (ii) **Energy and Environment:** Research related to the governance of socio-technical transitions in the energy sector, and associated issues related to the role of technology in addressing climate change adaptation and mitigation and other sustainable development challenges, air quality management, energy access, energy security and institutional reform in the energy sector; (iii) **Internet, Digital Information and Society:** Research related to data science in public policy, automation and the labour market, AI and ethics, algorithmic bias, methodological innovations in causal inference and impact assessment, internet/social media and policy, digital information and privacy, voting technologies; (iv) **Innovation Systems and Processes:** Research related to the role of policies in strengthening actors, networks and institutions (and vice versa) to enhance the direction and pace of technological change, i.e. the invention, innovation and diffusion of new technologies to address key societal challenges; (v) **Industry and Economy:** Research related to better understanding the technological capabilities of India's industrial enterprises (ranging from large, established firms to startups), developing policies to enhance these capabilities and directing them to better engage with India's developmental challenges; (vi) **Sustainable Habitats:** Research on policy questions related to affordable housing, transportation and mobility, land use and zoning, gender and inclusion, urban governance and institutions, informality and the informal sector, role of ICTs and other technologies in urban development, and smart cities; (vii) **Technical Higher Education:** Research to understand patterns of research and educational performance of technical higher education institutions and developing policies to strengthen these institutions; understanding issues relating to broadening participation in S&T-relevant education and training, especially

marginalized groups/communities.

**28. BHARTI SCHOOL OF TELECOMMUNICATION TECHNOLOGY AND NAMAGEMENT (BSTTM):** All areas of Telecommunication Technology and Management.

**29. YARDI SCHOOL OF ARTIFICIAL INTELLIGENCE (ScAI):** In all areas of artificial intelligence, Subareas of interest include (but are not limited to) deep learning, reinforcement learning, probabilistic models, data mining, information retrieval, multi-agent systems, knowledge representation and reasoning, mathematical foundations of AI, ethics of AI, applied AI such as NLP, computer vision, robotics, AI on the edge, etc., and applications of AI to domain areas such as healthcare, agriculture, education, industry 4.0, etc. ScAI strongly encourages applicants with demonstrated track-record of working at the intersection of an application area and the AI fields. More details are found at <http://www.scai.iitd.ac.in>

#### NOTES:

- The specializations or research areas mentioned above against each Department/Centre/School are only indicative and not exhaustive. The Institute is open to receiving applications from candidates with specialization in these as well as in other related areas.
- The minimum requirement of qualifications and/or experience may be relaxed in respect of exceptionally outstanding candidates in certain areas.
- A mere fulfilment of required minimum qualifications and experience does not entitle a candidate to be called for presentation/discussion.
- The Institute reserves the right to fill or not to fill the posts advertised.
- Separate online application must be filled, if a candidate is applying for a Post-Doctoral Fellowship in more than one Departments/Centres/or Schools.

#### How to apply?

- It is a requirement that the candidate visit the Job Section on IIT Delhi website (<http://www.iitd.ac.in/jobs-iitd/index.html>), prepare and submit the duly completed applications for appointment against the above position. The website also contains useful information on various aspects of working and living at IIT Delhi as well as on the recruitment process.
- As a precaution, after submitting the application through the website, please retain a printed copy of the application with you. Candidates employed with Government/Semi-Government Organizations or with Autonomous Bodies must print a copy of the electronic submission and submit the printed version through proper channel at the address given below.

**Address for Communication:  
Faculty Recruitment Cell  
Indian Institute of Technology Delhi  
Hauz Khas, New Delhi – 110016 (INDIA)  
Telephone: +91 11 2654-8733  
E-mail: [fac\\_recruit@admin.iitd.ac.in](mailto:fac_recruit@admin.iitd.ac.in)**

**For any technical help please contact through email to: [eadminhelp@iitd.ac.in](mailto:eadminhelp@iitd.ac.in) or Ph. 011-26597220**

**(Updated on 1<sup>st</sup> July 2023)**