



## UNIVERSITY OF DELHI SOUTH CAMPUS

Centre for Innovation in Infectious Disease Research, Education and Training  
University of Delhi South Campus  
Benito Juarez Road, New Delhi 110021  
[ciidret@south.du.ac.in](mailto:ciidret@south.du.ac.in); [www.ciidret.du.ac.in](http://www.ciidret.du.ac.in)

280123

### **Subject: Faculty Development programme (FDP) on “Advanced Technologies in Life Sciences”**

Dear Colleagues/Friend from Academia and Industry,

The University of Delhi is celebrating its centenary year, and to mark these 100 glorious years of education and empowerment, and to contribute in these celebrations, two institutions of the University, Centre for Innovation in Infectious Diseases, Research, Education and Training (CIIDRET) and Delhi School of Skill Enhancement & Entrepreneurship Development (IoE-DSSEED), a part of the Institution of Eminence (IoE), have joined hands to organise a ‘100 days festival of Training and Skill Enhancement’ (Flyer attached). In this endeavour, many University colleges, Academies and Biopharma Industries have joined as partners.

As a part of the Festival, One Week (Online) Faculty Development Programme on “Advanced Technologies in Life Sciences” is being organised by CIIDRET and IoE-DSSEED in collaboration with Mahatma Hansraj Faculty Development Centre (MHRFDC), Hansraj College during 6th February to 11th February, 2023 in online mode from 1.30-5.00 PM (two lectures of 90 min each) each day.

### **Details about the lectures and the faculty are given in the attached a brochure (Brochure FDP Faculty and Abstract 270123)**

**ELIGIBILITY:** The programme is interdisciplinary and is open to all interested. All faculty members (Permanent/Temporary/ Adhoc/ Guest) and Research Scholars from any university/college are eligible to participate. There is a nominal fee of Rs. 500 for all the sessions and the host institution issues a certificate to those who attend the sessions.

Desirous eligible persons need to register during the link given in the flyer

(<https://bit.ly/3kcwKJ4>).

However, on our request, the hosting Centre has allowed registration of the Industry scientists (M.Sc. and above) without paying any fee. **However, they will NOT get a certificate.** Since the Google form during registration asks for payment details and requires you to upload the screenshot of the payment portal, Industry participants may upload their valid Company ID Card. Following this, the hosting centre will check the validity of the registration and send the information and the link to attend on or before 4<sup>th</sup> Feb, 2023.

We request you to kindly circulate the attachments among your faculty in Life sciences and allied fields, who can get registered as per their eligibility and be benefited with this FDP.





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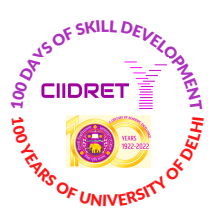
All the speakers have been selected very carefully and have good experience in teaching. The contents will be very beneficial to all concerned. The schedule and the details about the speakers along with an abstract of the talk will be shared by the hosting institution to those who are eligible and get registered. More details can be found at <https://ciidret.du.ac.in/>

With Regards,

Professor Amita Gupta (AG; 9811509609), Director, CIIDRET, University of Delhi South Campus, New Delhi. (<https://ciidret.du.ac.in/>)

Professor Vijay Chaudhary (VKC; 9811800434), NASI Senior Scientist, CIIDRET & Director (Hon.), Delhi School for Skill Enhancement & Entrepreneurship Development (**DSSEED**), University of Delhi. (<https://www.ioe.du.ac.in/delhi-school-of-skill-enhancement-entrepreneurship-development/>).





दिल्ली विश्वविद्यालय **INSTITUTION OF EMINENCE**  
University of Delhi प्रतिष्ठित संस्थान

**DELHI SCHOOL OF SKILL ENHANCEMENT & ENTREPRENEURSHIP DEVELOPMENT**



सत्यमेव जयते  
**Ministry of Education**  
Government of India



# ONE-WEEK ONLINE FACULTY DEVELOPMENT PROGRAMME on "ADVANCED TECHNOLOGIES IN LIFE SCIENCES" (February 6 - 11, 2023)

Online session from 1:30 pm - 5:00 pm (IST)

*Organised By*



**CENTRE FOR INNOVATION IN INFECTIOUS DISEASE,  
RESEARCH, EDUCATION & TRAINING (CIIDRET)**

<https://ciidret.du.ac.in>

&

**INSTITUTE OF EMINENCE(IOE)-DELHI SCHOOL OF  
SKILL ENHANCEMENT & ENTREPRENEURSHIP  
DEVELOPMENT(DSSEED)**

<https://www.ioe.du.ac.in/delhi-school-of-skill-enhancement-entrepreneurship-development>



*In Collaboration with*



**Mahatma Hansraj Faculty Development Centre**

(A centre of MoE, Govt. of India, under PMMMNMTT Scheme)

**Hansraj College**

(NAAC A+ CGPA 3.62, NIRF Rank #14)

**University of Delhi**

Malka Ganj, New Delhi - 110007

E.mail- [fdp.hrc@gmail.com](mailto:fdp.hrc@gmail.com)

For registration, please visit the given link

<https://bit.ly/3kcwKJ4>

Online sessions will be conducted on the Zoom platform. The link for the sessions will be shared with registered participants through the mail.

**Rs 500/-  
Registration  
Fee  
Applicable**

**Registration  
Deadline  
3rd Feb  
2023**

## Contact Details

Prof. Amita Gupta  
Director CIIDRET  
Contact No. - 9811509609  
email - [amitagupta@south.du.ac.in](mailto:amitagupta@south.du.ac.in)

Dr Vijay. K. Chaudhary  
Hon. Director DSSEED  
Contact No. - 9811800434  
email - [vkchaudhary@south.du.ac.in](mailto:vkchaudhary@south.du.ac.in)

## About PMMMNTT

The Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching emphasizes the need to change the role and working of a teacher from a mere disseminator of information and knowledge to one who advances frontiers of existing knowledge by actively developing and creating new insights into diverse social and physical phenomena.

## About Hansraj College, University of Delhi

Hansraj College is one of the largest constituent colleges of the University of Delhi and has been ranked as one of the top five colleges for Science, Arts and Commerce several times in the last decade. The faculty and students of the college have contributed immensely to academics, sports and cultural activities. The college faculty is dedicated towards the growth and development of the institution academically and administratively to thrive for excellence constantly. Hansraj graduates have been placed in diverse professions and services worldwide and are bringing fame and laurels to the institution.

## About Centre for Innovation in Infectious Disease, Research, Education & Training (CIIDRET)

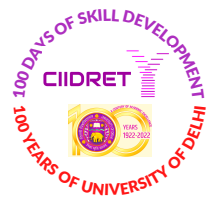
- Centre for Innovation in Infectious Disease Research, Education, and Training (CIIDRET) was established in October 2015 under Ordinance XV-A of the University of Delhi and with due approvals from the Academic Council and the Executive Council of the University.
- Professor Vijay Chaudhary was its founder director till August 2020 followed by Professor Yogendra Singh till March 2022. Professor Amita Gupta is the Current Director.
- As is reflected in its name, besides carrying out Innovative research by its core members, CIIDRET has been imparting training for different skills not only to students, but also the teachers and scientists from DU and outside institutions through hands-on courses in advanced technologies, CIIDRET has also been organising lectures by Innovators, Industry leaders and facilitators of research and innovation. CIIDRET has been providing state-of-the-art Proteomic and Genomic analytical facilities along with expert advice to scientists from academia and Industry and offers consultancy to the Biotech Industry.
- CIIDRET members are carrying out high-quality Innovative research on diagnostics and therapeutics for infectious diseases with a focus on HIV(AIDS), Tuberculosis, Chikungunya and COVID-19.
- CIIDRET has been amply supported by government funding agencies including DBT. Besides high-quality publications, most of the work has Intellectual Property value; hence, appropriate patent applications are regularly filed. The work carried out by CIIDRET core members has been adequately rewarded through National and International Awards.

## 100 Days Skill Development Festival

**The University of Delhi is celebrating its centenary year signifying 100 glorious years of education and empowerment.** To join in these celebrations, the Centre for Innovation in Infectious Diseases, Research, Education and Training (CIIDRET) and Delhi School of Skill Enhancement & Entrepreneurship Development (DSSEED), a part of the Institution of Eminence (IoE), have joined hands to organise a 100 days festival of Training and Skill Enhancement. Many University colleges and Biopharma Industries have joined as partners in the festival.

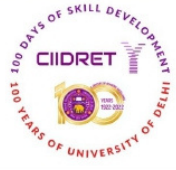
This 100-day festival brings together students, teachers, academicians, industry and facilitators on one platform and provides an ecosystem that promotes learning, collaboration and networking. Hands-on training courses and Public Lectures spanning diverse areas in Biotechnology are being conducted at the festival. The faculty for these courses include experienced teachers and renowned scientists from academia and industry. Customised courses on different topics and learning levels have been created for the skill development of students, research scholars, teachers and scientists.

This 100-day skill festival is in line with Our Hon'ble Prime Minister's vision of "Atmanirbhar Bharat" and a developed nation in 2047.



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# 100 DAYS SKILL DEVELOPMENT & TRAINING FESTIVAL

(Starting from 17th December 2022)



**100** Years of Delhi University

**100** Days of Skill Development

## 100 DAYS FOR YOU TO -

For Students,  
Research Scholars,  
Scientists , Teachers  
and Industry.

- Become a part of One of the Most Successful National Hands-On Training Eco-System.
- Know the Latest in Science.
- Cultivate Multi-Direction Research Approach.
- Enhance Skills Through "Learning by Doing".
- Interact with the Experts.
- Network with Academians and Industry Leaders.

### TRAINING MODULES -

1. TECHNIQUES FOR MANIPULATION OF NUCLEIC ACIDS FOR APPLICATIONS IN GENOMICS
2. NEXT-GENERATION SEQUENCING AND DATA ANALYSIS
3. ELISA AND ITS APPLICATIONS
4. PCR, REAL-TIME PCR AND ITS APPLICATIONS
5. RECOMBINANT PROTEIN EXPRESSION AND PURIFICATION

6. INFORMATICS TOOLS FOR BIOLOGISTS
  7. METHODS IN PHAGE BIOLOGY
  8. MICROBIOLOGICAL TECHNIQUES
  9. SCIENCE WRITING AND COMMUNICATION
  10. RECOMBINANT ANTIBODY TECHNOLOGY
- and many more.....

### Organized by-



**CENTER FOR INNOVATION IN INFECTIOUS DISEASE RESEARCH, EDUCATION AND TRAINING**  
<https://ciidret.du.ac.in/>



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University of Delhi प्रतिष्ठित संस्थान  
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<https://www.ioe.du.ac.in/delhi-school-of-skill-enhancement-entrepreneurship-development/>

### ACADEMIC PARTNERS



### INDUSTRY PARTNERS



Prof. Amita Gupta  
Director CIIDRET  
Contact No. - 9811509609  
email - amitagupta@south.du.ac.in

Dr Vijay. K. Chaudhary  
NASI-Senior Scientist, Hon. Director DSSEED  
Contact No. - 9811800434  
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## **IoE - Delhi School of Skill Enhancement and Entrepreneurship Development**

The University of Delhi, in its commitment to empower the nation and to make India Self-Reliant (Atmanirbhar Bharat), has established a flagship institute, Delhi School of Skill Enhancement and Entrepreneurship Development (DSSEED), under the Institution of Eminence (IoE).

It is headed by renowned innovator and Biochemist, Professor Vijay K. Chaudhary (Honorary Director). The DSSEED is guided by a Governing Body comprising eminent scientists and innovation facilitators under the Chairmanship of Prof. N. K. Ganguly, Former Director-General, of ICMR.

DSSEED envisages empowering young talent from all streams by providing them with opportunities at different levels-

- To enhance their skills in a structured manner through training, and to incubate the ideas leading to develop new processes, products and technologies.
- To develop an entrepreneurial spirit by creating an ecosystem that promotes launching, sustaining and expanding business ventures.

### **Objective of DSSEED-IoE**

- One of the prime objectives of DSSEED is to offer courses (Both Theory and hands-on) for enhancing the Skills of Undergraduates, Graduates and research scholars including young teachers of the University and also from other Institutions in all fields including Biological, Chemical, and Physical, Mathematical Sciences, Social science and Humanities, Commerce and Economics, Finance and Management, Law with special focus on IPR and Technology Transfer etc. to sharpen their research calibre and encourage them for Innovative research and taking up Entrepreneurship as a career option and to address and meet the immediate and ever-evolving future challenges in an integrated fashion and contribute to the national development.
- DSSEED will also provide incubation facilities for Students, and Entrepreneurs and also to research-minded College Teachers for furthering their research interests by providing the necessary infrastructure and the right ecosystem. The need for such an institution is in line with the Government of India's vision to enhance the incubation of new ideas, start-ups and entrepreneurship.
- The DSSEED will employ Innovative mechanisms in an integrated manner to shape young minds to meet global needs and fulfil the dream of "Make in India, Made for World".

## About the FDP - Objectives & Content

This FDP aims to educate about the modern tools and techniques employed in Life Science research and Innovation. The speakers from academic institutions and the Industry are authorities in the subject. The knowledge imparted will help in the teaching of the subject matter to students of FYUP and PG, and also in research activities. The FDP will also connect the participants with the experts for guidance in the future.

The topics in the FDP will be covered through online lectures with content encompassing the fundamentals to applications and case studies.

- Flow Cytometry, Fluorescence-activated Cell Sorting (FACS) and its applications.
- Chromatographic techniques for Protein purification.
- Next Generation Sequencing and its applications.
- Genomics-Driven Cancer Diagnostics.
- New Era of Vaccinology - The mRNA Platform
- DNA Fingerprinting and its Applications.
- Metabolomics and its applications.
- CRISPR (clustered regularly interspaced short palindromic repeats) and its applications
- Antibodies for diagnostics and therapeutics.

## Registration Details

Interested participants are requested to follow the steps mentioned below in order to register for the FDP:

- Participants are required to pay the registration fee of Rs. 500 via NEFT/IMPS/UPI to the following account:
- Account: Principal, Hansraj College, FDC
- Bank: Canara Bank, Hansraj College, Delhi
- Type of Account: Savings
- Account number: 2848101019873
- IFSC: CNRB0002848

### Note: Fee is Non-Refundable

1. Pre-registration for the programme is through online mode only.
2. Participants are required to fill out the registration form using the following link. (Please ensure that you have payment proof before filling up the registration form).
3. Registration link: <https://bit.ly/3kcwKJ4>
4. The last date for registration is 3rd February 2023.
5. Participants will be informed by 5th February 2023.
6. Attendance norms are strict. Participants are required to clear the assessment component for getting the e-certificate.
7. Further details will be communicated to the registered participants.
8. ELIGIBILITY: The programme is interdisciplinary and is open to all interested. All faculty members (Permanent/ Temporary/ Adhoc/ Guest) and Research Scholars from any university/college are eligible to participate.

# ORGANISING TEAM

## MHRFDC Team

Prof. (Dr.) Rama  
Principal, Hansraj College  
&  
Chairperson, MHRFDC

Prof. (Dr.) Jyoti Bhola  
Coordinator, MHRFDC

Mr. Ashutosh Yadav  
Dy. Coordinator, MHRFDC

## CIIDRET & DSSEED Team

Prof. Amita Gupta  
Director, CIIDRET  
FDP Convenor

Prof. Vijay K. Chaudhary  
Director (Hon.) DSSEED  
FDP Coordinator



### '100 Days Skill Festival'

Centre for Innovation in Infectious Diseases, Research, Education and Training (CIIDRET) and

Institution of Eminence (IoE)-Delhi School of Skill Enhancement & Entrepreneurship Development (IoE-DSSEED), University of Delhi

In collaboration with

Mahatma Hansraj Faculty Development Centre, Hansraj College, University of Delhi

Organise

One-Week Online Faculty Development Programme

"Advanced Technologies in Life Sciences"

February 6- 11, 2023 (online mode; sessions from 1.30 PM - 5 PM)

#### Faculty

#### Topic

#### Date and time

Dr. Manisha Suthar & Dr. Shashank Misra, BD Life Sciences



Basics of flow cytometry and cell sorting & applications of flow cytometry

6<sup>th</sup> February, 2023; 1.45 - 3.15PM

Dr. Parul Tomar Merck



Innovations in CRISPR advancing translational research

6<sup>th</sup> February, 2023; 3.30 - 5.00 PM

Dr. Vipin Kumar & Dr. Bhaskar, Cytiva (formerly GE Healthcare)



Protein purification techniques - what why and how

7<sup>th</sup> February, 2023; 1.30 - 3.00PM

Protein purification strategies

7<sup>th</sup> February, 2023; 3.30 - 5.00 PM

Dr. Shailesh Gochhait, Thermo Fisher Scientific.



Next generation sequencing and its clinical applications

8<sup>th</sup> February, 2023; 1.30 - 3.00PM

Dr. Amit Dutt, Tata Memorial Centre, Navi Mumbai,



Genomics-driven cancer diagnostics

8<sup>th</sup> February, 2023; 3.30 - 5.00 PM

Dr. Ajay Singh, Genova Biopharmaceuticals Ltd, Pune.



A new era of vaccinology – the mRNA platform

9<sup>th</sup> February, 2023 ; 1.30 - 3.00PM

Dr. R. Harinarayanan, Centre for DNA Fingerprinting and Diagnostics, Hyderabad



An overview of human DNA fingerprinting and its applications

9<sup>th</sup> February, 2023; 3.30 - 5.00 PM

Dr. Garima Khare, Department of Biochemistry, UDSC, New Delhi



Metabolomics and its applications -1

10<sup>th</sup> February, 2023; 1.30 - 3.00PM

Metabolomics and its applications -2

10<sup>th</sup> February, 2023; 3.30 - 5.00 PM

## Basics of Flowcytometry and Cell Sorting

(6<sup>th</sup> February, 2023; 1.45 - 2.30 PM)



Manisha Suthar, Application Specialist, BD Biosciences ([manisha.suthar@bd.com](mailto:manisha.suthar@bd.com))

A Postgraduate in Biotechnology, Mumbai University, trained in Flowcytometry in the department of Haematology (2016-2017) at Tata Memorial Hospital, Mumbai. She has worked at the National Institute of Immunohematology (2018-2019), Dept of leukocyte biology which works primarily on Primary Immunodeficiency Diseases. Since 2019, I have been working with BD as an Application Specialist for Flowcytometry for training various students and lab personnel on different BD platforms and helping in standardizing various assays in Clinical and research setups.

Flow cytometry is a technology that simultaneously measures and then analyses multiple physical characteristics of single particles, usually cells, as they flow in a fluid stream through a beam of light. The properties measured include a particle's relative size, relative granularity or internal complexity, and relative fluorescence intensity. This is often achieved by using various fluorescently tagged markers/antibodies. These light signals are converted into electronic signals that are analysed by a computer.

Modern flow cytometers can analyse many thousands of particles per second, in "real-time" which generates statistically robust data and makes it a powerful and popular technology amongst scientists. A specific type of these flow cytometers is a cell sorter, which can purify and collect samples for further analysis at similar rates.

## Applications of Flow cytometry

(6<sup>th</sup> February, 2023; 2.30 - 3.15 PM)



Dr. Shashank Misra, Application Scientist  
(shashank.misra@bd.com)

As an Application Scientist, Dr. Misra is responsible for FACS Academy operation, training programs and field application support primarily to the North Region.

He has 4.5 years of experience in field Application Support in various firms such as Beckman Coulter India Pvt. Ltd. and Imperial Life Sciences. During his professional and research career, he has gained expertise in Clinical & Research Flow Cytometry, Cell & Animal Imaging and Protein Detection platforms. He holds a doctorate in Philosophy (Science) degree in Life Sciences from the Institute of Nuclear Medicine & Allied Sciences (INMAS)/ Bharathiar University, Post Graduate Diploma in Business Administration from IMT-CDL Ghaziabad and a Master in Science (Biotechnology) from North Bengal University.

## Innovations in CRISPR advancing translational research

(6<sup>th</sup> February, 2023; 3.30 - 5.00 PM)



**Dr. Parul Tomar**, PhD, Technical & Product Marketing Manager, Science & Lab Solutions-APAC, Biology ([parul.tomar@merckgroup.com](mailto:parul.tomar@merckgroup.com))

Parul Tomar obtained her PhD degree in Translational biology & Epigenetics from the Max Planck Institute of Immunobiology & Epigenetics, Freiburg, Germany. Her thesis work focused on the RNA polymerase pausing mediated molecular mechanisms by which chromatin exerts control over stress responses. Prior to that, she obtained her Master's degree in biology from the Tata Institute of Fundamental Research, Mumbai where she worked on molecular and genetic mechanisms underlying complex traits in *S.cerevisiae*. Dr. Parul joined the Commercial & Technical Marketing group at Merck in 2018, where she utilizes her technical expertise to support researchers with Molecular biology and functional genomics products for solving the toughest problems in life sciences.

CRISPR/Cas systems have evolved within bacterial and archaeal organisms as a defence against invading viruses and plasmids. The type II CRISPR/Cas system from the bacterium *Streptococcus pyogenes* has been engineered to function in eukaryotic cells using two molecular components: a single Cas9 protein and a non-coding guide RNA (gRNA). The Cas9 endonuclease can be programmed with a single gRNA, directing a DNA double-strand break (DSB) at a desired genomic location. Merck offers a broad portfolio of products for the use of CRISPR technology, which enables genome modification in a variety of model organisms. In this talk, I will highlight the key requirements of CRISPR reagents for preclinical and translational research, and how they can be used in a variety of applications to provide enhanced specificity without sacrificing cutting activity.

## Protein Purification Techniques & strategies

(7<sup>th</sup> February, 2023 ; 1.30 - 5.00 PM)



### **Dr. Bhaskar**

has completed Doctorate from the Department of Biochemistry, CSIR-Central Drug Research Institute, India. His expertise includes protein biochemistry, protein purification, protein characterization using AKTA protein purification and Biacore SPR System or WB techniques, NGS, etc. He focuses

on managing unpredictable requirements for specific skill sets and providing users with product and application training. Currently, he is associated with Cytiva as an Application scientist, where he leads the protein purification and characterization range of products across the South Asia Region.



### **Dr Vipin Kumar**

Dr. Vipin Kumar has completed his Doctorate from the Department of Biosciences and Bioengineering of IIT Bombay, India. He has 8+ years of research experience in the field of proteomics techniques. His expertise includes Gel-based proteomics, protein purification using the AKTA system, protein analysis using Biacore

or WB techniques, NGS, etc. He focuses on managing unpredictable requirements for specific skill sets and providing user product and application training. Currently, he is associated with Cytiva as an Application scientist, leading the proteomics range of products across the South Asia Region

Workshop conducted by Cytiva (formerly GE Healthcare) designed for Biologists interested in learning chromatographic techniques suitable for production-scale protein purification.

In **Session A - Protein Purification Techniques - What Why and How**) participants will learn about different types of chromatography, different resins, and their applications. The rationale behind protein purification and method selection shall be discussed.

**Session B - Protein Purification strategies** will give an insight to the participants about the difference between analytical and preparative grade resins followed by resin selection strategies for the experiments. Multiple case studies shall be shared as a testimony to the strategies being discussed.

**At the end of the sessions, there will be a Session C - Online Quiz**

## Next Generation Sequencing and its Clinical applications

(8<sup>th</sup> February, 2023; 1.30 - 3.00 PM)



Dr. Shailesh Gochhait, Thermo Fisher Scientific.

He completed his PhD. From Jawaharlal Nehru University 2008 under the guidance of Prof.

Bamezai in the field of Genetic heterogeneity in Breast cancer.

Post a small project at Oxford on Genetic susceptibility of Leprosy with Dr. Adrian Hill, joined Applied Biosystems as application support for a variety of technologies including qPCR, Sanger Sequencing, Microarray, NGS, forensics etc.

With more than 12 years of experience, now involved in the exciting field of Clinical sequencing.

In his lecture, he will be covering the basics of how the technology (Ion Torrent Next Generation Sequencing platform) works and the solutions around clinical research.

## Genomics-Driven Cancer Diagnostics

(8<sup>th</sup> February, 2023; 3.30 - 5.00 PM)



Dr Amit Dutt is a Principal Investigator and Scientist G at ACTREC, Tata Memorial Centre, Mumbai ([adutt@actrec.gov.in](mailto:adutt@actrec.gov.in))

He obtained his PhD from the University of Zurich, Switzerland and ICGEB/ JMI, New Delhi. He was a postdoctoral fellow at the Broad Institute of Harvard and MIT. His

laboratory focuses on understanding the somatic changes that occur in human cancer cells and how these changes can help develop the next generation of effective targeted therapies to improve the treatment of cancer patients. Dr Dutt is a recipient of the Swiss National Science Foundation fellowship award; the Julius Klaus Foundation award from the University of Zurich; the Ramalingaswami Fellowship Award from the Department of Biotechnology (DBT); the Wellcome Trust/ DBT India Alliance Intermediate Fellowship Award; YIM Boston Young Scientist Award; Outstanding Alumni award from JMI, and the Shanti Swarup Bhatnagar Award in the field of Medical Sciences 2017.

Massively parallel Next-generation sequencing (NGS) is one of the most powerful diagnostic tools that enable precision medicine in cancer by allowing the rapid and comprehensive analysis of a patient's cancer genome. NGS can be used to identify genetic mutations that are associated with specific types of cancer and also to identify changes in DNA copy number, gene expression, and other genetic variations that affect cancer development and progression. This information can be used to classify cancers based on their molecular mechanisms, which in turn can inform the development of more effective diagnostic and treatment options.

## New era of vaccinology – the mRNA platform

(9<sup>th</sup>February, 2023; 1.30 - 3.00 PM)



**Dr. Ajay Singh**, Gennova Biopharmaceuticals Limited, Pune. (Ajay.Singh@gennova.co.in)

Dr. Singh completed his doctorate at the University of Delhi South Campus. He has been an integral part of Gennova Biopharmaceuticals Ltd since 2013. He is a proficient molecular biologist and biochemist with a core specialization in mRNA therapeutics, Cell & Gene therapy, antibody engineering, and phage display. The recent outcome of his scientific excellence is the GEMCOVAC™-19, India's first fully indigenous mRNA vaccine for combating COVID-19 followed by an Omicron-specific booster in Human trials. Using a similar platform, mRNA vaccines against many infectious diseases and Cell & Gene therapy products are in the pipeline.

Vaccines are important biological tools involving Live attenuated, Protein subunits, DNA, and mRNA; that help in preventing infection by introducing the antigenic piece of any pathogen into the body, thereby triggering an immune response and preparing the body to fight that infection. Focusing our attention on the most advanced and promising mRNA platform, they are indeed revolutionizing the future path for treatments against cancer and infectious diseases, offering immense benefits of shorter and less time-consuming developmental processes followed by economic benefits. mRNA is a disease agonist platform where the antigenic sequences are just altered keeping the platform un-disturbed.

## An overview of Human DNA Fingerprinting Technology and its Applications

(9<sup>th</sup> February, 2023; 3.30 - 5.00 PM)



**Dr. R. Harinarayanan, Ph.D.**, Scientist In-Charge, Laboratory of DNA Fingerprinting Services, CDFD, Hyderabad 500039 (Hari@cdfd.org.in)

Dr. Harinarayanan completed his PhD, from the Centre for Cellular & Molecular Biology (CCMB), Hyderabad in the area of Bacterial Genetics and followed up with post-doctoral training at the National Institutes of Health, Bethesda, USA in the same field. He joined CDFD as a staff scientist in 2009 and has been part of the Laboratory of Bacterial Genetics and additionally serving as the In-charge of the Laboratory of DNA Fingerprinting Services since February 2020.

DNA Fingerprinting (also called DNA Profiling) is the process of determining characteristics unique to an individual's DNA. It can be used to study the DNA in any living thing but the emphasis in this talk will be on humans. Two unrelated individuals on average share 99.7% of DNA. The 0.3% that is different is spread across the genome and makes each individual unique. The differences in the DNA can be primarily of two kinds, namely, sequence variations and length variations. The method for detection of length variations using short tandem repeats (STR) will be described and how this can be used to infer relationships between individuals will be discussed. Especially, the utility of DNA fingerprinting in paternity/maternity disputes, establishing the identity of the deceased using forensic samples, identification of perpetrators in sexual assault, and establishing relationships between donor and recipient for organ transplants will be discussed.

## Metabolomics and its applications

(10<sup>th</sup>February, 2023; 1.30 - 5.00 PM)



**Dr. Garima Khare** is working as an Assistant Professor at Department of Biochemistry since 2014. She completed her PhD from the Department of Biochemistry, University of Delhi South Campus in the field of tuberculosis research. She is a recipient of the Innovative Young Biotechnologists Award of the Department of Biotechnology, Government of India in 2013. Dr. Khare is also In-charge of the BSL3/ABSL3 facility dedicated to TB research at UDSC. She has been conducting various training programmes and courses for BSL3 training and handling practices for *Mycobacterium tuberculosis*. She has published several research articles in various international peer-review journals and book chapters.

Her research efforts are focused on the area of Tuberculosis primarily pertaining to the identification of novel inhibitors against *Mycobacterium tuberculosis*, the causative agent of tuberculosis, which can be developed into potent drugs against TB. Her laboratory is also dedicated to understanding host-pathogen interactions involved in TB pathogenesis. Additionally, her laboratory is also working to understand the persistence and drug unresponsiveness of *Mycobacterium tuberculosis* inside unconventional niches such as Mesenchymal stem cells.

Metabolomics is the global-level comprehensive analysis of small molecules, commonly known as metabolites in a biological specimen.

These small molecules and their interactions within a biological system are known as the metabolome. The cellular-level analysis of metabolites represents the final snapshot of the cellular processes occurring in the given cell at the given time. Hence, metabolomics is a powerful approach that directly reflects the underlying biochemical activity and state of cells/tissues.

Metabolomics gained tremendous progress after the advent of mass spectrometry and various metabolite databases. In view of the very high incidence of human diseases, it is urgently required to have a better understanding of the related mechanisms regarding endogenous metabolism. Mass spectrometry-based metabolomics has been used in a variety of disease research areas for various applications including biomarker discovery, development of diagnostic assays, identifying new drug targets etc. The lectures in this FDP will include an overview of metabolomics, various kinds of metabolic profiling, the use of mass spectrometry for metabolomics and a few examples of its use in disease-related applications.



*Supported by*

**DBT-Genomic Facility at UDSC**

**DBT-CoE on Antibody Technology**

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