GLOBAL INITIATIVE OF ACADEMIC NETWORKS

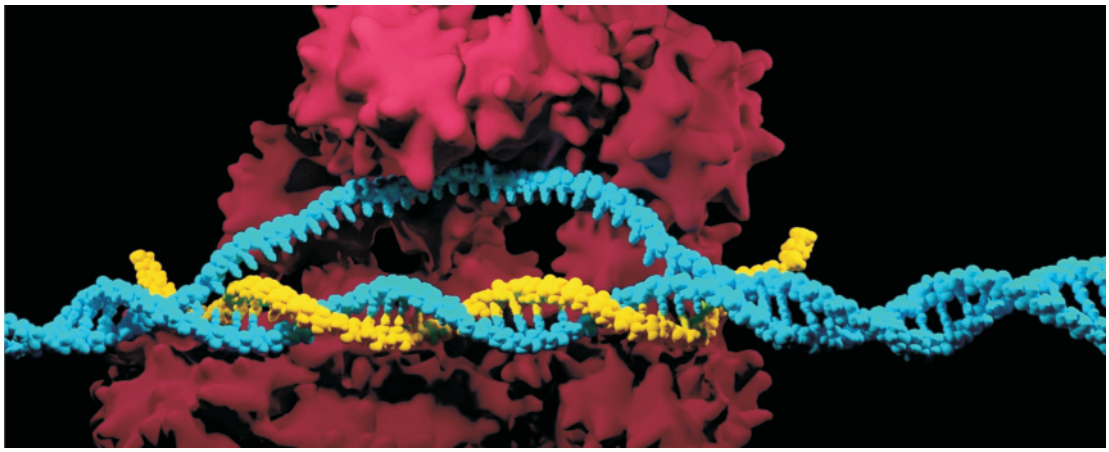
सत्यमेव जयते
MHRD
GOVERNMENT OF INDIA

DEPARTMENT OF BIO & NANO TECHNOLOGY
GURU JAMBHESHWAR UNIVERSITY OF SCIENCE AND TECHNOLOGY
HISAR-125001 (HARYANA)

ORGANIZES TWO-WEEK WORKSHOP COURSE
ON

Genome Manipulations, Editing and Interference by VIGS, CRISPR and RNAi.

March 5th - 14th, 2019



I ABOUT THE COURSE:

The advent of genomics has caused a major change in the way we approach genetics and its technological implications. Whilst the use of genetic models such as the fly *Drosophila melanogaster,* the worm *Caenorahbditis elegans,* the plant *Arabidopsis thaliana* or the yeast *Saccharomyces cerevisiae* has been extremely helpful to identify genetic functions, the current issue is to transfer knowledge to organisms of interest. The so-called reverse genetic approach uses technologies to modify the expression of a single gene, or a small number, thus gaining insight into the function. These experimental procedures allow to gear efforts towards biological process engineering and improvement. Amongst the tools developed by the scientific community there are a number of possibilities that achieve gene silencing and overexpression. The course is giving a first-hand approach to the main technologies that have been used in the last years and show great potential for their use both in research and biotechnological environments. We will cover the rationale behind reverse genetics, and several techniques that are considered next-generation as they are environment friendly.

II. OBJECTIVES

The primary objectives of the course are as follows:

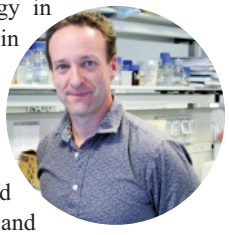
1. Exposing participants to the fundamentals of reverse genetics
2. Give an in-depth view of Virus Induced Gene Silencing, RNAi-mediated gene silencing and CRISPR/CAS9 mediated genome engineering
3. Develop practical skills on construct development
4. Design complete projects “from gene to the field” with the corresponding experimental designs, controls and technical requirements to produce useful products

III. THE COURSE DETAILS

Day 1: Tuesday March 5, 2019	Lecture 1: 9:30 to 10:30 AM Reverse genetics concepts Lecture 2: 10:45 to 11:45 AM Evolutionary genetic principles applied to genome engineering Lab1: 2:00 to 4 PM Search and identification of genes in databases (online practical, internet access required)
Day 2: Wednesday March 6, 2019	Lecture 3: 9:30 to 10:30 AM Genetic principles underlying post-transcriptional gene silencing Lecture 4: 10:45 to 11:45 AM Virus-Induced gene silencing Lab2: 2:00 to 4.00 PM Design of inserts for VIGS experiments (online practical, internet access required)
Day 3: Thursday March 7, 2019	Lecture 5: 9:30 to 10:30 AM Design of RNAi constructs I- Inserts Lecture 8: 10:45 to 11:45 AM Design of RNAi constructs II- Vectors Lab 3: 2:00 to 4.00 PM Design of primers and complete constructs of RNAi (online practical, internet access required)
Day 4: Friday March 8, 2019	Lecture 7: 9:30 to 10:30 AM Basic concepts of CRISPR/CAS9 Lecture 8: 10:45 to 11:45 AM CRISPR/CAS vectors, principles and cloning strategies Lab 4: 2:00 to 4.00 PM Design of primers and complete constructs of CRISPR/CAS (online practical, internet access)
Day 5: Saturday March 9, 2019	Lecture 9: 9:30 to 10:30 AM Identification of transgenic material Lecture 10: 10:45 to 11:45 AM Determination of silencing at the molecular level Lab 5: 2:00 to 4.00 PM Molecular assessment of loss of function caused by RNAi (Laboratory work requiring Molecular biology setup)
Day 6: Sunday March 10, 2019	Lecture 11: 9:30 to 10:30 AM Environmental issues, cis-genics, transgenics and CRISPR modified material Lecture 12: 10:45 to 11:45 AM Genetics of environmental safety Lab 6: 2:00 to 4.00 PM Food safety and molecular techniques to detect transgenic material (Laboratory work requiring Molecular biology setup)
Day 7: Monday March 11, 2019	Lecture 13: 9:30 to 10:30 AM Genetic stability of transgenic material Lecture 14: 10:45 to 11:45 AM Epigenetic processes and gene expression Lab 7: 2:00 to 4.00 PM Molecular assessment of loss of function caused by VIGS (Laboratory work requiring Molecular biology setup)
Day 8: Tuesday March 12, 2019	Lecture 15: 9:30 to 10:30 AM Phenotypic analysis of mutants and genetically modified material I. Phenomics and image acquision Lecture 16: 10:45 to 11:45 AM Phenotypic analysis of transgenic material II. Phenomics and image analysis Lab 8: 2:00 to 4.00 PM Molecular assessment of loss of function caused by CRISPR (Laboratory work requiring Molecular biology setup)
Day 9: Wednesday March 13, 2019	Lecture 17: 9:30 to 10:30 AM Phenotypic analysis of scent and secondary metabolites Lecture 18: 10:45 to 11:45 AM Circadian analysis of scent Lab 9: 2:00 to 4.00 PM: A General discussion
Day 10: Thursday March 14, 2019	Lecture 19: 9:30 to 10:30 AM : Exam Lecture 20: 10:45 to 11:45 AM : Oral presentations Lab 10: 2:00 to 4.00 PM : Oral presentations
Training Delivery Methodology	Our creative, interactive and relevant sessions would actively engagethe participants from the outset and they will be ready to apply what they have learnt as soon as they are back at their institutions.
Who can Apply	M.Sc./ M.Tech /Ph.D. scholar / faculty in the field of biotechnology, biochemistry , microbiology, bioinformatics, food technology , environmental science, pharmacy, botany zoology and other field of life sciences can apply.
Fee	The participants are required to get registered on GIAN web portal (http://www.gian.iitkgp.ac.in). The course registration fee is separate. The participation fees (Demand draft drawn in favour of Registrar, GJUS&T, Hisar or NEFT/RTGS at PNB A/C No. 4674000100036542 IFSC: PUNB0467400) for attending the course is as follows: Foreign delegates: US $500 Participants from Industry: ₹ 15,000/- Participants from Indian Academic Institutions/ Research Organizations: ₹ 4,000/- Students of Host-Department: ₹ 1,000/- and Scholar of Host-Department: ₹ 2,000/- The above fee includes all instructional materials, computer use for tutorials and assignments, chemical costs, equipment usage charges, and internet facility. However, the participants will be provided accommodation on payment basis, subject to availability.

Note: Number of participants for the course will be limited to fifty

IV. A BRIEF PROFILE OF THE INVITED EXPERTS



Prof. Dr. Marcos Egea-Cortines studied biology in Spain. He did his PhD in tomato development in Ben-Gurion University, Israel, and two post-doctoral stays at the Technion Israel and the Max-Planck Institute for Plant Breeding Research in Germany. He established his research team in the Technical University of Cartagena, (Universidad Politécnica de Cartagena - UPCT), Spain in 1999 and has worked on flower and fruit development, having collaborat ions on cancer research and food safety. His research team is currently working on the genetic and environmental control of floral development and scent emission. Together with other members of the UPCT, he started a technology development research line to create automatic phenotyping systems to help in work performed with plants subject to reverse genetic genome engineering. His lab has pioneered transformation protocols in difficult plants such as *Antirrhinum.* Currently there are six PhD students in the lab working on circadian clock, scent genes and bioinformatics applied to image analysis. The lab has produced over 30 research papers in high ranking journals such as Plant Physiology, Plant Journal, Scientific Reports, Frontiers in Plant Sciences and Nature Plants. More than 35 degree thesis, master thesis and 5 PhD thesis have been supervised. Currently Dr. Egea-Cortines is associate editor of Frontiers in Plant Sciences. Since October 2016 he is the director of the Instituto de Biotecnología Vegetal (Institute of Plant Biotechnology) at the UPCT

V ABOUT THE COURSE COORDINATOR

Dr. Vinod Chhokar completed his Masters and Doctorate degree in Biochemistry from CCS Haryana Agricultural University, Hisar and is presently working as Professor and Chairperson, Department of Bio and Nano Technology, Guru Jambheshwar university of Science and Technology, Hisar, Haryana, India. He has over 23 years of research and 18 years PG Teaching experience. Dr. Chhokar has availed prestigious BOYSCAST fellowship by Department of Science and Technology, Govt. of India for carrying out advanced research in the area of plant secondary metabolism at Purdue University, West Lafayette, USA in the year 2010-11. During his professional career, he has guided more than 90 M.Sc./M.Tech/ M.Phil. and 9 Ph.D. students while 8 are pursuing for their doctoral research. His current research focuses on biochemistry, molecular biology, genomics and metabolomics for healthcare applications and genetic improvement program. He has published one book entitled "Basic Concepts of Immunology" and more than 80 research papers in various journals of national and international repute. Prof. Chhokar has received several grants from national and international funding agencies like UGC, HSCST, DST, DBT, ASRT-Egypt etc.

VI ABOUT THE COURSE CO- COORDINATOR

Dr. Anil Kumar received his Master and Ph.D. degree in Biotechnology from Guru Jambheshwar University of Science and Technology. Presently he is serving as Assistant Professor of Biotechnology in the Department of Bio and Nano Technology, Guru Jambheshwar University of Science and Technology since 2005. Dr. Kumar is instrumental in conceptualizing course contents of M.Sc. (Biotechnology) and involved in teaching various courses of M.Sc. (Biotechnology) and M.Sc. (Microbiology) such as Immunology and Animal Cell Culture, Cell Biology, Medical Biotechnology, Biotechniques etc. He has successfully completed two major research project funded by UGC, New Delhi and HSCST, Panchkula (Haryana) and two minor projects. He has published one book entitled "Basic Concepts of Immunology" and more than 38 research papers in various journals of national and international reputes. He has supervised 71 M.Sc. students and 6 Ph.D. students are pursuing for their doctoral research.

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Course Co-ordinator

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REGISTRATION FORM

Personal Information: (write in capital letters)

1) Name of the Participant: Mr./Ms./Mrs./Dr./Prof._____

2) Gender:_____

3) Date of Birth:_____

4) Academic Qualification & Designation:_____

5) Institution/Organization:_____

6) Address for Communication:_____

_____

7) E-Mail ID:_____

8) Mobile Number(s):_____

9) Payment Details (DD/NEFT/RTGS)

(a) Demand Draft:_____

_____

(b) NEFT/RTGS:_____

_____

10) Accommodation Required (Yes/No):_____

(Note: GIAN is not providing food and accommodation for the participants)

Signature of the Participant

Duly Filled Registration form along with payment details (attached demand draft, if done) should be sent to the following Address:

Foreign delegates: US $500
Participants from Industry: ₹ 15,000/-
Participants from Indian Academic Institutions/ Research Organizations: ₹ 4,000/-
Students of Host-Department: ₹ 1,000/- and Scholar of Host-Department: ₹ 2,000/-
The above fee includes all instructional materials, computer use for tutorials and assignments, chemical costs, equipment usage charges, and internet facility. However, the participants will be provided accommodation on payment basis, subject to availability.

Course Co-ordinator
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