

The Indian Agricultural Research Institute, New Delhi, invites applications from MSc and PhD students of IARI for a two weeks **Student's Winter School** on "**Genomics of plant pathogens and agriculturally important microbes**" sponsored by NAHEP-Centre for Advanced **Agricultural Science and Technology (CAAST)**, Indian Council of Agricultural Research, New Delhi.

WHO CAN PARTICIPATE

MSc and PhD students of IARI are eligible to apply. The number of participants will be limited to **twenty five ONLY**

REGISTRATION FEES: No registration fee is to be paid; the programme is fully sponsored by NAHEP-CAAST

HOW TO APPLY

Complete application form in the prescribed format forwarded by chairperson should reach the **Principal investigator, NAHEP-Centre for Advanced Agricultural Science and Technology (CAAST), Division of Plant Physiology, ICAR-IARI, New Delhi** on or before **30th November 2018**; application form can be downloaded from www.iari.res.in

TRAVEL

No travelling allowance will be provided by the organizers as students are expected to make their own arrangement to reach the venue at 9:30am on all working days

FOOD and ACCOMMODATION

Tea and snacks will be served during the programme and expenditure will be met from the training budget. However, no accommodation will be arranged as students are already accommodated in IARI- hostels

DURATION

Two weeks- December 17-28, 2018

Venue:

Lectures: Auditorium, Division of Plant Pathology, ICAR-Indian Agricultural Research Institute, Pusa Campus, New Delhi-110012.

Practicals: PG laboratory, Division of Plant Pathology, ICAR-Indian Agricultural Research Institute, Pusa Campus, New Delhi-110012.

Organizers

Course Director

Dr. C. Viswanathan

Principal Investigator, NAHEP-Centre for Advanced *Agricultural Science and Technology* (CAAST) and Head (Acting), Division of Plant Physiology, ICAR-IARI, Pusa Campus, New Delhi-110012,

Email: viswanathan@iari.res.in

Phone: 91-11-25842815, 09013885245

Course Coordinators

Dr. A. Kumar

Principal Scientist, Division of Plant Pathology, ICAR-IARI, Pusa Campus, New Delhi-110012

Email: kumar@iari.res.in, kaundy@yahoo.com,

Phone: 09540829009

Dr. K. Annapurna

Head, Division of Microbiology, ICAR-IARI, Pusa Campus New Delhi 110 012

Email: annapurna96@yahoo.co.in

Phone: 011-25847649

The programme is jointly coordinated by Divisions of Plant Pathology and Microbiology at IARI



National Agricultural Higher Education Project (NAHEP)

Sponsored

Student's Winter School

Genomics of plant pathogens and agriculturally important microbes

December 17 -28, 2018

at

Division of Plant Pathology,
ICAR-IARI, Pusa Campus, New Delhi



Organized by

Center for Advanced Agricultural Science and
Technology (CAAST)

Indian Agricultural Research Institute
Pusa Campus, New Delhi- 110012

About NAHEP-CAAST

Centre for Advanced Agricultural Science and Technology (CAAST) is a new initiative and student centric sub-component of **World Bank** sponsored **National Agricultural Higher Education Project (NAHEP)** granted to IARI to provide a platform for strengthening educational and research activities of post graduate and doctoral students. CAAST theme for IARI is **Genomic assisted crop improvement and resource management** that specifically aims at inculcating genomics literacy and skills among the student of IARI.

Background

Global food production needs to keep pace with ever growing human population of 7 billion that is expected to touch 10 billion by 2050. With shrinking cultivable area and consequent 'agricultural habitat loss' for sustained crop production, one of the approaches for ensuring, sustaining and enhancing the agricultural productivity and nutritional security is by reducing the losses due to biotic and abiotic stress factors. Biotic factors like pest & diseases, multitude of climate and environmental related abiotic factors are among the major constraints that threaten global agriculture.

Traditionally plant stresses, especially biotic ones are managed by deploying resistant cultivars and application of chemical molecules. These approaches, though very effective, are not universally adopted in all situations. While crop resistance is not durable, the chemicals are not a sustainable solution as a long term strategy. Therefore, novel and innovative approaches are, indeed, essential for mitigating the crop losses. Plant associated microorganism are known to play a vital role in shaping and guiding plant growth, development and confers defense against biotic and abiotic stresses.

In the recent years microbe assisted crop production is gaining momentum as a supplementary strategy in agriculture that is expected to make major impact in clean agricultural production. However, the vast diversity of microbial communities in plant associated niches is not exploited properly for want of appropriate technologies.

The cracking of first microbial genome by **Craig Venter** in the year 1996 has culminated in the birth of **science of genomics**. In the last two decade, 'omics science' and the genomic data has enabled us to understand diverse plant associated microbial communities, pathogens of crop plants and their behavior on plant associated niches. The exponential growth of genome related information and the associated "Omics tools" provided an opportunity for the plant pathologist and microbiologist to understand the population genetics of microorganisms and their host interactions at cellular and genome level.

A total of **312,877** whole genome sequencing projects encompassing most of the plant pathogens and microbes are underway throughout the world that includes **278953 Prokaryotes**, **24,987 Eukaryotes**, and **8,937 viruses** as on **23 August 2018** (<https://gold.jgi.doe.gov/>). In order to harness the potential of the genome information, we need to create appropriate infrastructure facilities and human resources to face the challenges in the coming decades.

Pathogenomics and microbial genome initiatives at IARI

The ICAR-IARI, New Delhi has made significant contributions in developing crop protection and production technologies for all major crops in India. The institute has core strength in the area of genomics and modern research facilities for conducting advanced genomics programmes. Recently the institute has published the whole genome sequences of agriculturally important free living nitrogen fixing diazotrophic microorganisms as *Pseudomonas stutzeri* and *Bacillus* species, ***Magnaporthe oryzae* inciting blast in rice**, ***Tilletia indica* causing Karnal Bunt**, ***Cochliobolus sativus* causing spot blotch of wheat**, ***Puccinia striiformis* causing yellow rust of wheat**, ***Fusarium fujikuroi* inciting bakanae disease of rice**, ***Ralstonia solanacearum* causing wilt**, ***Meloidogyne graminicola* infecting rice** and **several plant viruses**. Besides, metagenome analysis of plant microbiomes of major crops is also generated and published. With this background the **Centre for Advanced Agricultural Science and Technology (CAAST)** under NAHEP is organizing 2-weeks Student's Winter School on "**Genomics of plant pathogens and agriculturally important microbes**" for the benefit of students of IARI, New Delhi

COURSE OUTLINE

The winter school has the following components:

A. Lectures on principles and practices of basic & advanced genomic techniques used in Plant Pathology, Microbiology and Nematology

The lectures will be delivered in the forenoon during the training period. Evolution of various pre- and post-genomic era techniques used in plant pathology and microbiology will be discussed.

B. Demonstration and visits for Sequencing and computing facilities

Video demonstrations on genomic library preparation for whole genome sequencing. Visit to facilities like TEM, SEM, Confocal Microscope, Genome sequencers, Bioinformatic data center, Phenomics facility etc.

C. Group activities for case studies

Student groups will be allotted a set of plant pathogens and microorganisms to characterize using genomic tools.

D. Interactive discussion presentation and Quiz

Each student is expected to make a short presentation of their present work and future work plan on pathogenomics and microbial genomics programme of their choice organism. Presentation will be facilitated by coordinators during evening hours on all days during the programme. Students are also encouraged to bring their own biological material to work with.



Application deadline: 30th November 2018