# Department of Plant Science

## National Workshop

## 'Application of genomic tools in Plant Science'

(Covering aspects of Research Methodology and Skill Development)

**August 8-12, 2016**

## Report

**Introduction:** Advances in genomic technologies is revolutionizing every biological field. In recent times, not only has genomics developed into an independent field of science but also influences the fundamental ways in which the biologists are doing research. The high throughput sequencing techniques that led to the birth of the science of genomics is only a decade old. The advent of genomics has led to new terms like 'precision medicine 'and 'precision agriculture'. In the coming years personal genomics is expected to improve individual health by providing personalized risk information about a multitude of diseases and thereby achieve better health outcomes. Also in the last 10 years, genomics has led to unparalleled advances in our understanding of plants and the genomic data underpins many aspects of plant trait improvement, design of climate smart crops and precision agriculture. Though the impact of genomics is apparent, the amazing and accelerating pace of technology development in this field promises more than we can comprehend at present. In this context, a new breed of plant scientists capable of integrating biological science with sophisticated computational approaches or genomic tools is needed to make sense and take full advantage of the wealth of data brought forth by genomics.

The Workshop 'Application of genomic tools in Plant Science' was organized at the Department of Plant Science from Aug. 8-12, 2016 with the financial support from Central University of Kerala. The objective of this workshop was to train graduate scholars and early career academicians various tools available to analyze high-throughput data. The intake capacity of the workshop was 20. We received 28 applications and 20 were selected based on their field of research and study and informed. Nineteen participants registered for the workshop and participated in the training program. The participants were from various Institutes and

Universities in south India like Kannur university, Karnataka University, MG university, IISER-Bhopal Central University of Tamil Nadu and Central University of Kerala. The accommodation for outstation candidates were arranged in dormitories of the adjacent Church - Good Shepherd church, Padannakkad.

**Day 1 (Aug. 8)**

The workshop was formally inaugurated by Hon. Vice Chancellor of CUK, Prof. G. Gopakumar at the main seminar hall, RSTC. After the inaugural ceremony, there was a small welcome session. The organizing secretary Dr. Ginny Antony welcomed the candidates and took stock of the participants needs and expectations. She also gave overview of the workshop through the days. This was followed by a talk by Dr. Tony Grace - Introduction to NGS platforms wherein he gave a comprehensive lecture on the various methods and platforms available to generate high throughput data. This was followed by another talk 'The lessons from 16GB wheat genome' by Dr. Alagu Manickavelu, Associate Professor, Dept. of Genomic science. Dr. Manickavelu, in his talk explained in detail the challenges faced by the scientific community in sequencing a polyploid crop like wheat with huge amount of duplication and repeat sequences. Ater the talks the participants and faculty of school of Biological Sciences interacted at the welcome dinner at Nalanda resort.

**Day 2 (Aug. 9)**

The day 2 started with a talk by our guest speaker Dr. Aashish Ranjan, Scientist at National Institute of Plant Genome Research, New Delhi. His talk described the approaches specifically transcriptome sequence based studies to identify the genes involved in *Cuscuta* parasitism and the basis of patterning in unicellular algae- *Caulerpa taxifolia.* This was followed by hands on training by Mr. Bipin Balan , Programmer at Scigenomics Inc. Banglore on Basic LinuX based commands, Vim editor, Basic pearl programming.

**Day 3 (Aug.10)**

Dr. M. K. Rajesh, Principal Scientist, CPCRI started the day with a talk on " applications of NGS to accelerate palm breeding'. His talk encompassed genomic techniques used for improving agronomic traits in oil palm and the possibilities for palm improvement with the availability of draft genome of date palm. After the talk the particiants were given training various tools available for reference based whole genome sequence analysis and RNA seq analysis.

**Day 4 (Aug. 11)**

The fourth day of the workshop started with a talk by Dr. Ananda Sarkar, scientist at NIPGR, New Delhi on 'Functional genomics using Laser Capture Microdissection (LCM) based approach. He describe in detail LAM an advanced technique that is used for gene expression studies in small specific population of cells. After the talk, each student was given an opportunity to do WGS and RNA seq analysis on their own using Galaxy- GUI platform for sequence analysis. Dr. Tony Grace supervised the session and he was assisted by Aravind K. (Ph.D Scholar, Dept. of Genomic Science) and Amal Vasu (Junior Research Fellow- Plant Science).

**Day 5 (Aug. 12)**

On the final day of the workshop, Dr. Mukesh Jain gave a talk on 'Next generation genomic tools for rapid discovery of genes associated with agronomic traits in crop plants'. In his talk he described how chickpea genome was sequenced and how this information transformed the research on chickpea improvement. After the morning session the participants were given hands on training on gene expression analysis both absolute and relative quantification using Real Time PCR.

The workshop concluded with a valedictory session where the participants gave a oral as well as written feedback on their experience in the past 5 days. All participants were presented with a completion certificate by Prof. Dennis Thomas T. The organizing secretary Dr. Ginny Antony expressed her gratitude to all the members of the organizing committee for their generous support and guidance.

**Dr. Ginny Antony**

Organizing Secretary


National
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on
APPLICATION OF GENOMIC TOOLS
IN PLANT SCIENCE
8th 12th August 2016
Department of Plant Science
Central University of Kerala

## Registrants for the workshop

| Name of the applicant | Designation | Affiliation |
|---|---|---|
| Sruthi S. | Ph.D. Scholar | Plant Science,CU Kerala |
| Lineesha K. A. | Ph.D Scholar | Plant Science,CU Kerala |
| Dr. Sangeetha Jeyabalan | Assistant Professor | Environmental Science, CU Kerala |
| Sabana A. A. | Ph.D. Scholar | Plant Science,CU Kerala |
| Umasree V. R. | MSc graduate | Kannur University |
| Minu M. Nair | MSc graduate | IISER-Bhopal |
| Sherin Jose | MSc Scholar | Kerala Agricultural University |
| Suraby E.J. | Senior Research Fellow | Indian Insituteof Spices Research |
| Dr. Devarajan Thangadurai | Assistant Professor | Karnatak University, Dharwad |
| Binoop Mohan | Project assistant | CPCRI, Kasaragod |
| Shalini K. | Ph.D. Scholar | Genomic Science, CUKerala |
| Shamjana U. | Ph.D Scholar | Genomic Science, CUK |
| Deepthi M. | Ph.D. Scholar | Genomic Science, CUK |
| Preety Sweta Hembrom | Ph.D. Scholar | Genomic Science, CUK |
| Deepa A.V. | Ph.D Scholar | Genomic Science, CUK |
| Akhil M. | Ph.D scholar | Life Science, CU Tamil Nadu |
| Benedict Analin A. | Ph.D Scholar | Life Science, CU Tamil Nadu |
| Vidya D. | MSc. Graduate | Plant Science, CU Kerala |
| Abhijit Kumar | Research assistant | ICAR-CPCRI |