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Department of
BIOSCIENCES

Hands-on Experience in Advanced Research Techniques

SSSIHL 2017/18

3-8 JUL 2017 @ PRASANTHI NILAYAM CAMPUS

HEART - 2017

HANDS-ON EXPERIENCE IN ADVANCED RESEARCH TECHNIQUES

3rd - 8th July

EXPERIMENTAL AND COMPUTATIONAL TRAINING WORKSHOP IN

METABOLOMICS - PROTEOMICS - GENOMICS

Department of Biosciences

Sri Sathya Sai Institute of Higher Learning

Prasanthi Nilayam

in association with

BCM Baylor College of Medicine

Agilent Technologies

Department of Biotechnology

BIOINFORMATICS

BTISNet - BIF SSSIHL

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HEART 2017

Hands-on Experience in Advanced Research Techniques (HEART): Experimental and Computational Training Workshop on Metabolomics, Proteomics and Genomics.

3-8 Jul 2017

The five-day HEART workshop was organized at Sri Sathya Sai Institute of Higher Learning (SSSIHL) as a collaboration between scientists from the US and India, and Departments of Biosciences and Chemistry, SSSIHL.

The conference covered hands-on training in the areas of protein and metabolomics mass spectrometry as well as protein, metabolite and genome informatics. A total of 11 scientists from academia in the US and India as well as Agilent Technologies USA/India conducted the training workshop (please refer to the attachment for names of scientists and their respective affiliation).

Each day, the agenda for the workshop included a two-hour scientific talk by the external experts focused on application of various **OMICS*** in disease research followed by the hand on training workshop.

**technologies that measure some characteristic of a large family of cellular molecules, such as genes, proteins, or small metabolites, have been named by appending the suffix "-omics," as in "genomics." Omics refers to the collective technologies used to explore the roles, relationships, and actions of the various types of molecules that make up the cells of an organism.*

These technologies include: Genomics (the study of genes and their function), Proteomics (the study of proteins), Metabonomics (the study of molecules involved in cellular metabolism), Transcriptomics (the study of the mRNA), Glycomics (the study of cellular carbohydrates) and Lipomics (the study of cellular lipids).

Source: AltTox.org

The training workshop was divided into four parallel sessions:

- Genome informatics
- Protein and metabolite informatics
- Protein mass spectrometry
- Metabolite mass spectrometry

In addition, sessions on experimental design and one-on-one discussions with research scholars on their respective thesis projects were conducted. The **main objective of each training session was to provide information and know-how on the respective technologies in the context of specific thesis projects.**

A total of 25 research scholars and five faculty members from Departments of Chemistry and Biosciences, SSSIHL attended.

Below is a summary of each of the four training sessions:

- Genomics Informatics: This training session was conducted by **Mrs. Sai Lakshmi** from Baylor College of Medicine. The focus of this session was to examine genomics datasets associated with antibiotic resistant bacteria, provide know-how on data presentation and encourage students to come up with experimental plan for additional downstream experiments.

- Proteomics and Metabolomics Informatics: This training session was conducted by **Mrs. Bandana Prasad** from Agilent Technologies, India. Trainees obtained know-how on analyzing large scale proteomics and metabolomics data set using mass profiler and gene spring. They also learnt to portray molecular signatures in pathway context. Trainees were taught to search and download their project related

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public domain datasets and examine them for molecular and clinical correlations. The training session also provided basics of biostatistics and training on biostatistics tools in mass profiler and gene spring.

- **Protein Mass Spectrometry**: The objective of this session was to provide training on sample preparation and unbiased protein mass spectrometry using Quadrupole Time-Of-Flight mass spectrometer. The training sessions were conducted by **Drs. Vadiraja Bhat** and **Ashish Pargaonkar** from Agilent Technologies USA and India, respectively. Trainees were given training on both mass spectrometer hardware and software.

- **Metabolomics Mass Spectrometry**: This session was conducted by **Drs. Nagireddy Putluri**, **Arun Sreekumar** and **Vasanta Putluri**. Training was provided on sample preparation and mass spectrometry. The latter included hardware and software training. Trainees were given know-how on method development, data analysis and data interpretation.

Importantly, following two days of intense training, all the trainees were tested for their level of understanding by asking them to repeat various facets of the training sessions independently on days 3-5.

- Multiple sessions on experimental design were conducted and round table discussions were held on pre-requisites for clinical translational research, biomarker development and therapeutic target identification.

At the end of the conference, trainees were asked to complete a survey and comment on benefits and areas of improvement. Individual google groups were created for each of the training sessions involving the trainees and their respective subject expert. The google group will serve as a share-point for data and technical support and should help trainees get additional support from the experts during the course of their experimentation.