

Capacity-building WORKSHOPS for researchers & students in June-July 2018

Employability and research advancement today requires the best data analysis skills! We have been successfully offering multiple types of hands-on training to scientists ([visit our website to see some of the feedbacks](#))

PREPARATORY DAY [*free and compulsory for students / beginners attending other courses; also designed to assist specialists from other domains*]

17th June 2018 [Sunday]

Review of basic concepts required for advanced courses

Complex modern concepts in simple terms: *Demystifying modern biology: biotechnology, bioinformatics, systems biology, synthetic biology, drug discovery, generics, biologics & biosimilars, big-data in biology, current trends in omics, etc*

How is end-user bioinformatics different from other bioinformatics activities?

An overview of computational biology and relevance of programming

MAIN WORKSHOPS

1. BASIC BIOINFORMATICS AND BASIC DATA MINING WITH AN OVERVIEW OF SYSTEMS BIOLOGY AND SYNTHETIC BIOLOGY

18th to 20th June 2018

DAY-1 [Monday, 18th June 2018]:

- Gene-based data mining: Entrez Gene, Gene cards, Uniprot, HPRD, UCSC, etc
- Advanced strategies in literature based data mining and biocuration [*demo & hands-on*]
- Case studies for selected genes, proteins and diseases [*demo & hands-on*]

DAY-2 [Tuesday, 19th June 2018]:

Bioinformatics exercises for molecular cloning

- Selecting genes based on disease relevance or expression patterns [*demo & hands-on*]
- Retrieving sequences of RNA or genes [*demo & hands-on*]
- Primer designing & restriction site analysis [*demo & hands-on*]

DAY-3 [Wednesday, 20th June 2018]:

- Concepts in sequence analysis
- Basic sequence analysis exercises [demo & hands-on]
- Advanced sequence analysis exercises [demo & hands-on]

2. NEXT GENERATION SEQUENCING & DATA ANALYSIS

21st to 23rd June 2018

DAY-1 [Thursday, 21st June 2018]:

- An overview of NGS technology
- NGS applications to genomics & transcriptomics, and conceptual discussions
- FASTQ format, depth and coverage of reads
- NGS data retrieval using SRA & ENA [demo & hands-on]
- Quality analysis and trimming of raw reads [demo & hands-on]

DAY-2 [Friday, 22nd June 2018]:

- NGS whole-genome & exome sequencing, and reference assembly
- SNP analysis concepts & resources
- Reference genomes retrieval using UCSC [demo]
- Reference alignment of NGS reads [demo & hands-on]
- SNP analysis, filtering and annotation [demo & hands-on]
- *De-novo* assembly concepts and annotation process
- *De-novo* assembly of reads to contigs [demo]

DAY-3 [Saturday, 23rd June 2018]:

- RNA-sequencing and concepts
- Identification of gene & transcript levels, and differential expression [demo & hands-on]
- Metagenomics, the need & approach, and resources
- Metagenomics analysis of NGS reads [demo]

3. IPR, GMP, GLP, DRUG DISCOVERY, CLINICAL TRIALS & GCPS

24th June 2018 [Sunday]

Interactive sessions on industrially relevant concepts and regulatory aspects.

[NOTE: detailed courses can be organized for groups on any industrially relevant topics listed above, or others such as tech transfer, pharmacovigilance, protein characterization, fermentation, downstream processing, vendor qualification, etc]

4. FUNCTIONAL OMICS DATA ANALYSIS [ALSO SEE MICROARRAY DATA ANALYSIS]

25th & 26th June 2018

DAY-1 [Monday; 25th June 2018]:

- Relevance of transcriptomics & proteomics: mass scale gene expression techniques and corresponding data
- Introduction to protein-interactions, non-coding RNA, ontology and pathways
- Case studies on molecular interactions *[demo & hands-on]*
- Case studies on pathways *[demo & hands-on]*

DAY-2 [Tuesday; 26th June 2018]:

- An overview on functional analysis process and tools
- Gene Ontology information retrieval *[demo]*
- Gene enrichment analysis using DAVID functional analysis tool *[demo & hands-on]*
- Network analysis using Cytoscape *[demo & hands on]*

5. MICROARRAY & DATA ANALYSIS [ALSO SEE FUNCTIONAL OMICS ANALYSIS]

27th to 29th June 2018

DAY-1 [Wednesday, 27th June 2018]:

- Gene expression studies, microarray technology: an overview
- Data files, and analysis workflow
- Applications and resources
- Data retrieval using GEO & ArrayExpress *[demo & hands-on]*

DAY-2 [Thursday, 28th June 2018]:

- Normalization and clustering principles
- Differential expression analysis
- Microarray data analysis using R package *[demo & hands-on]*

DAY-3 [Friday, 29th June 2018]:

- Microarray resources, and data retrieval
- Network analysis using 'R' *[demo & hands-on]*
- Case studies using microarray resource BioGPS *[demo & hands-on]*
- Microarray data analysis using online tools *[demo & hands-on]*

6. PROTEOMICS & DRUG DISCOVERY

DAY-1 [Saturday, 30th June 2018]:

- An overview of proteomic techniques and link with transcriptomics
- Protein interaction analysis and pathways
- Case studies in molecular interaction analysis *[demo & hands-on]*

8 HOURS TO DISCUSS YOUR FUTURE: HIGHER STUDIES (INDIA/ABROAD), GETTING JOBS AND PLANNING A SUCCESSFUL CAREER *[free for students/unemployed youth participating in any of the listed courses]*

1st July 2018 [Sunday]

- Job and career options available in India, abroad, and industry and academia;
- Opportunity to take entry into a unique bio-recruiters' database
- Discussions and counseling for choices on all following aspects: PhD, MS,

DAY-2 [Monday, 2nd July 2018]:

- An overview of drug discovery concepts and link to basic research
- Homology modeling *[theory, demo & hands-on]*
- Docking studies *[theory, demo & hands-on]*

7. BIOSTATS & R:

7th to 9th July 2018

DAY-1 [Saturday, 7th July 2018]:

- Qualitative and quantitative data, tabular and visual representation of data
- Types of graphical presentation of observations
- Discrete and continuous data types
- Variance within a data set;
- Types of distributions
- Population, samples and probability concept.

DAY-2 [Sunday, 8th July 2018]:

- Chi-square test, t-tests, Z-tests, Welch's test
- Wilcoxon-Mann-Whitney test, ANOVA
- Error analysis and error estimates for formulas
- Type-I and Type-II errors, power of statistical test; error bars on plots
- Linear regression, least square fit to a linear, polynomial and exponential curves

DAY-3 [Monday, 9th July 2018]:

- Common data summarization and representations in biology - part I
- 'R' as a statistical package and its common applications
- Mathematical operations and string manipulation
- Common data summarization and representations in biology - part II
- Data structures and logical statements
- Writing user defined functions and packages
- Reading and writing tables and files. Logical statements and loops, break R graphics library; error analysis and error bars.

FEES & OTHER DETAILS

Rs. 2000 to 5000 per person per day (depending on the course) for professionals - depending on the course and type of profession (academic/corporate)

Rs. 750 to 1500 per person per day - for students/unemployed youth [some courses will be free for students] depending on the course.

Group applicants, early applicants and applicants having economic disadvantages are eligible for further discounts.

Course organizer: Prof. Kshitish Acharya K

Venue: Shodhaka Life Sciences Pvt. Ltd., Electronic city, Phase I, Bengaluru

Please contact us for details.

Email: messenger@shodhaka.com [**PREFERRED MODE OF CORRESPONDENCE**]

Phone: 98 444 700 60 (please call only between 6pm & 8pm on working days or 10am to 6pm on Sunday)