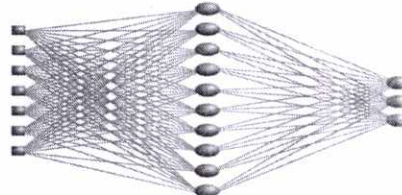
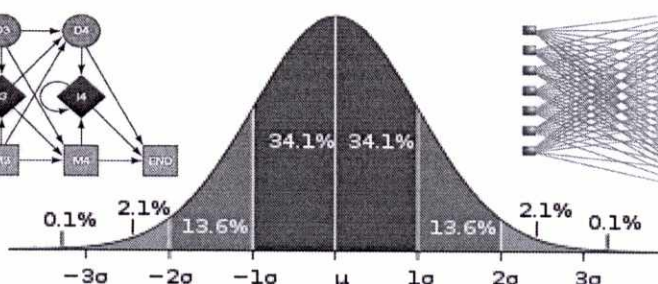
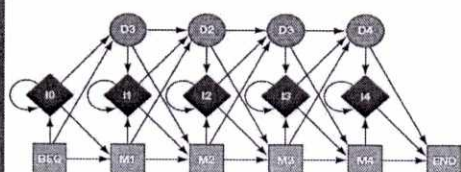
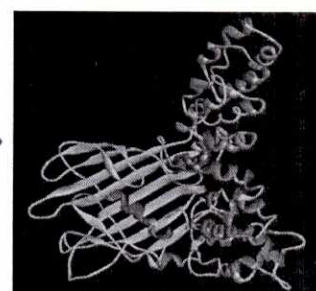
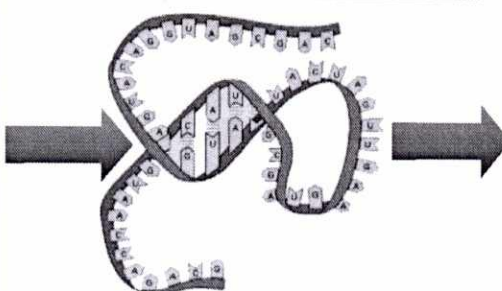
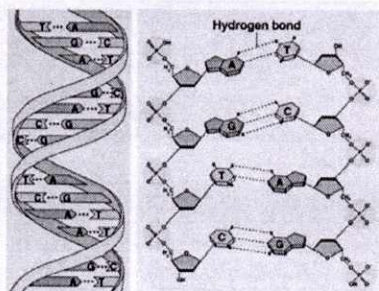
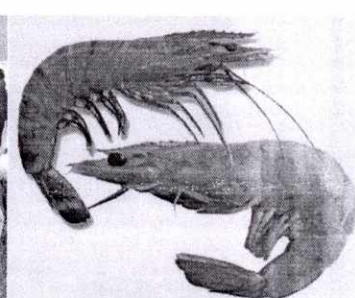
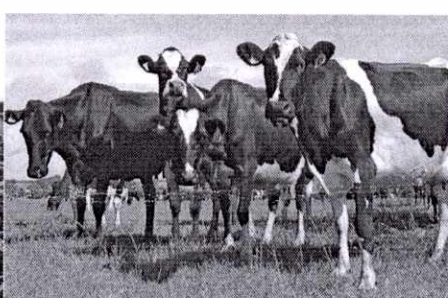


**ICAR Winter School  
On  
Recent Advances in Quantitative Genetics  
and Statistical Genomics  
(06-11-2012 to 26-11-2012)**



**Course Director: Dr. A. R. Rao**



**Centre for Agricultural Bioinformatics (CABin)  
Indian Agricultural Statistics Research Institute  
Library Avenue, Pusa, New Delhi 110 012**





## COURSE DETAILS

### Rationale

Driven by the recent developments in crop, animal and fish genome projects, quantitative genetics and statistical genomics are taking an ever increasing role, both directly and indirectly, in food production and quality, resistance / tolerance to biotic and abiotic stresses. Although classical breeding and genetics have made significant achievements in increasing crop productivity, still the growth rate of food production is lagging behind the ever-increasing required growth rate. Such target may be met by supplementing the genome sequencing data with the breeding data. Analyzing large amount of sequence data together with breeding data needs advanced statistical techniques and powerful statistical software. Further, there is a great demand for individuals trained in quantitative genetics and statistical genomics as well as expertise in usage of advanced statistical software. Keeping this in view, the present Winter School on Quantitative Genetics and Statistical Genomics is being organized under the aegis of Education division, ICAR.

### Objectives

- To provide advance training to the researchers and lecturers of NARS in quantitative genetics and statistical genomics
- To familiarize the participants with the statistical and computational tools / software used for data analysis in breeding, genetics, genomics and bioinformatics.
- To help upgrade the research and teaching skills of the participants.

Besides the above mentioned objectives, an opportunity will be provided to all the participants to exchange their ideas to specialists / teachers in quantitative genetics and statistical genomics with a view to increase contacts and thus develop understanding among each other's achievements and problems. Also, a platform will be created to foster inter-institutional co-operative research projects.

### Course Contents

The course has been structured in a series of modules with class room lectures and practicals on computers, including the demonstration of software packages. The course manual will be provided to all the participants. Participants would be given opportunity to share their research experiences through presentations and group discussions. The participants are advised to come with their experimental data sets for analysis.

#### Module 1. Some Preliminaries

- Statistical methods, inference and multivariate techniques
- Population genetics and quantitative genetics
- Statistical genomics
- Selection for genetic improvement

#### Module 2. Software for Data Analysis

- Commercial Software □ SAS, SPSS, etc.
- Open Source Software - R
- Statistical packages for plant / animal breeding data - SPAR, SPAB, etc.
- JbinMap, MapQTL, PowerCore, etc.
- QLC Genomics Workbench, ClustalX, Structure, etc.

#### Module 3. Advanced Statistical Methods in Breeding and Genetics

- Mating designs and analysis of breeding data
- Robust estimation of genetic parameters
- Mixed models in quantitative genetics
- Multivariate techniques in plant / animal breeding
- Genotype x Environment interaction in crop / animal improvement □ AMMI & others
- Statistical techniques for core set identification in germplasm trials

#### Module 4. Statistical Techniques in Genomics

- Determination and identification of optimum number of molecular markers for classification
- Detection and estimation of Quantitative Trait Loci (QTL)
- Statistical techniques in Whole Genome Association (WGA) analysis

- Machine learning approaches (Supervised and un-supervised) for analysis of high-dimensional data
- Penalized regression and Random Forest methodologies for genomic selection
- Multiple Hypothesis Testing □ False Discovery Rate (FDR), etc.

#### Module 5. Miscellaneous topics

- Statistical modeling in genomics
- Sequence alignment and protein structure prediction
- Hidden Markov Models for motif discovery
- Analysis of microarray data
- Next Generation Sequence analysis

### Venue

Indian Agricultural Statistics Research Institute, Library Avenue, Pusa, New Delhi-12.

### Duration

06<sup>th</sup> November to 26<sup>th</sup> November 2012 (21 Days)

### Eligibility

- Master's Degree in any branch of Agriculture, Veterinary Sciences, Fisheries, Basic Sciences, etc.
- Working in a position not below the rank of Scientist / Assistant Professor or equivalent having a minimum of 2 years research / teaching experience in SAUs / ICAR institutes.

### Nominations

The applicants desirous of participation in the winter school and fulfilling the eligibility conditions may apply through proper channel. Participants will be paid travel fare to and fro by rail as per their entitlement class of travel restricted to the maximum of AC II Tier fare or bus or other means of transport in vogue as the case may be. Free boarding and lodging will be provided to the participants during the training program.

Number of participants: 25

Last date for receipt of nomination: 26-09-12

Selected candidates will be informed by 01-10-12

### Registration fees

The participants are required to pay a sum of ₹ 50/- as registration fees (Non-refundable) at the time of registration for joining the winter school.

About IASRI <http://www.iasri.res.in>

IASRI is a premier Institute, mainly responsible for conducting research and education / training in the field of Agricultural Statistics, Computer Applications and Bioinformatics. With the passage of time the Institute has equipped itself with the modern facilities, which include:

- Computing facilities: The Institute has several computer laboratories well equipped with latest hardware and software along with modern teaching aids. Recently, a Statistical and Computational Genomics Lab (SCGL) Facility has been developed at the Institute
- Library: The library has rich collection of books and journals on Statistics, Computer Science and Bioinformatics including on line journals and bibliographic databases

All correspondence may be addressed to:

Dr. V.K.Bhatia

Director

Indian Agricultural Statistics Research Institute

Pusa, Library Avenue, New Delhi-110012.

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Dr. A.R.Rao

Course Director

Winter School on Quantitative Genetics and Statistical Genomics

Indian Agricultural Statistics Research Institute

Pusa, Library Avenue, New Delhi-110012.

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Phone: 011- 25847122; Extn.: 4157; Cell: 09999422935

THANK YOU

## APPLICATION FORM FOR PARTICIPATION IN WINTER SCHOOL

1. Full name (in block letter):
2. Designation:
3. Present employer and address:
4. Address to which reply should be sent:
5. Permanent address:
6. Date of birth:
7. Sex: Male / Female
8. Teaching / research / professional experience (mention post held) during last 5 years and number of publications):
9. Marital status: Married / Unmarried
10. Mention, if you have participated in any research seminar, Summer / Winter School / Short Course, etc. during the previous 3 years under I.C.A.R./Other organizations
11. Academic record (from Bachelor's degree onwards):

Degree	Subject	Year	Class	Board/ Institute/ University

Date \_\_\_\_\_

Signature of the applicant

Place \_\_\_\_\_

12. Recommendations of the forwarding Institute

Signature \_\_\_\_\_

Designation \_\_\_\_\_

Date \_\_\_\_\_

Address \_\_\_\_\_

### CERTIFICATE

It is certified that the information was furnished by the office record and was found correct

Signature and designation of the sponsoring authority

N.B.: If more copies of form are required, the same may be multiplied and distributed.