

INSTITUTE OF MATHEMATICS & APPLICATIONS

(Established by the Govt. of Odisha)
Andharua, Bhubaneswar-751003

No: 91/23/2017

Date: 11.01.17

RESEARCH SEMINAR NOTICE

Venue: T. Pati Hall

Date: 13th January 2017

Time: 11.00 AM-1.00 PM

Speaker: Professor Pabitra Pal Choudhury, Head, Applied Statistics Unit,
Indian Statistical Institute, Kolkata.

**Title: Classification of Genes and Proteins Using Mathematics.
(Motivated to New Drug Research)**

All interested are invited.


DIRECTOR

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8. 38 number of selected Professors from Bhubaneswar.

Classification of Genes and Proteins Using Mathematics (Motivated to New Drug Research)

Pabitra Pal Choudhury, Indian Statistical Institute, Kolkata

Part I: Abstract

We deal with the problems of (i) Classification of Genes and (ii) Classification of Proteins. For the (i) and (ii) we have developed separate mathematical strategies. For (i) while encoding A, T, C, G we used 1-variable Boolean functions, and for (ii) While encoding conventional 20 Amino Acids and 5 non-conventional Amino Acids we used 1-variable ternary valued functions.

The genetic code is the set of rules encoded in genetic material (DNA or RNA sequences) is translated into proteins (amino acid sequences) by living cells. The code maps a tri-nucleotide sequence, called codon, into corresponding amino acid. Since there are 20 amino acids and 64 possible codons, more than one among these 64 codons can code for a single amino acid which incorporates the problem of Degeneracy. We explain this degeneracy of codon table with the help of a mathematical parameter "Impression" of an amino acid.

It may be mentioned that we have undertaken one research work where it has been demonstrated the behavioral difference of PPCA among its homologs in C_7 family towards recognition of Deoxycholate (DXCA).


Part II: Abstract

Essentially we discuss various classification strategies of n-variable (any base) functions using mathematical logic and application route to Genomics.

Studies are directed on conventional myosin heavy chain II family in humans based on chemical nature of Amino Acids- uniqueness of cardiac muscle of myosin group and non-muscle myosin group can be established.

We look for several protein families for which chemical /Biological functions are well known. Say, for example we work on enzymes/proteins (L-myo-inositol 1-phosphate Synthase, Ino1 gene, MIPS) of various living groups for common mathematical characteristics.

Our mathematical ideas on the classification methodology will be applied in protein classification of various protein families. Thus the co-relation of the mathematical properties with the Biochemical properties of a given class could be gradually established. It may be noted that this is the pre-requirement of the "new drug research".


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