

Winter School on Molecular Evolution in Bacteria

5th – 15th, December 2016

Global Initiative of Academic Network (GIAN) Programme, Tezpur University, Napaam, Sonitpur, Assam-784 028, INDIA

1. Details of the event

The Winter School on Molecular Evolution in Bacteria was jointly organized by department of molecular biology and biotechnology, Tezpur University during 05-12-2016 to 15-12-2016. The school was funded by Govt. of India under Global Initiative for Academic Networks (GIAN) program in higher education. Faculties associated with the school were Dr. Suvendra Kumar Ray, Dept. of MBBT, Tezpur University, Dr. Siddhartha Sankar Satapathy, Dept. Comp. Sc. and Engg., Tezpur University and Prof. Edward Feil, Milner Centre for Evolution, Department of Biology and Biochemistry, University of Bath, UK. In total twenty participants attended the school. Twenty-nine lecturers were delivered on several topics such as Selection-Mutation-Drift and Neutral theory of molecular evolution; Recombination in Bacteria: mechanisms, functions and detection; Molecular typing, recombination and population structure; Whole genome sequencing- the accessory and core genomes; Molecular epidemiology (the case of Staphylococcus aureus -MRSA); Genome degradation in bacterial endosymbionts; Metagenomics and the human microbiome; codon usage bias etc. along with the hands-on sessions on compositional analysis of DNA sequence.

2. Photographs with captions



Resource persons and participants in the winter school



B Borah
11/02/2022
Head
Department of Computer Science & Engg.
Tezpur University

Winter School On Molecular Evolution in Bacteria

5th - 15th December, 2016

An Event Under



Overview & Scope of the School

Evolution is an integral part of biology. So there is a major thrust in molecular evolution in the genomic era. However, this subject has mainly considered by scientist as too much computationally involved, which therefore discourage biologists to venture into it. This also affects students of biology to avoid this course. Learning molecular evolution is a fun. It needs a proper way to be taught to young investigators. Keeping this in minds and to share with scientists of India the recent developments in molecular evolution, this winter school is being proposed.

The participants of the school will be introduced to the different topics such as theories of molecular evolution, nucleotide composition in genome, strand asymmetry in chromosome, codon usage bias, selection using dN/dS and co-translational protein folding.

Evolution study in bacteria gives insight into our basic understanding of evolutionary mechanisms. Its genome is simple. Genome G+C composition in bacteria varies from 15 to 75 %. What determines genome composition is an interesting question to understand molecular evolution in bacteria. The genome in bacteria is well organized with respect to gene distribution between the strands as well as along the ori to terminus. Bacteria also have been a model for experimental evolution in some laboratories. Recent studies on bacterial evolution will be discussed in the winter school.

Course participants will learn these topics through lectures and hands-on practical sessions.

Topics in Brief

Theories of molecular evolution

SMD and Neutral theory of evolution

Nucleotide composition in DNA

Chargaff's 2nd Parity Rule

Strand inequalities in DNA

Strand inequality in mutation rate and asymmetry in DNA

Asymmetry between the leading and the lagging strands in chromosomes

Asymmetry along the origin and terminus in bacterial chromosomes

Codon usage bias

Codon usage bias and different measures, Role of selection on codon usage bias

Structure of biomolecules and codon Usage Bias

mRNA and protein structure
co-translational protein folding

Genome wide analysis of codon usage bias

Ribosome profile, Codon context

Selection by studying dN/dS

dN/dS, positive, negative and neutral selection in genes

Life style of bacteria affecting molecular evolution

Adaptation of bacteria in different niches, Pathogenic vs. non-pathogenic bacteria



B. B. B. B.
11/02/2022
Head
Department of Computer Science & Engg
Anna University

Faculty

Guest Faculty



Professor Edward Feil is a member of faculty at The Milner Centre for Evolution, Department of Biology and Biochemistry, University of Bath, UK. His research interests focus on short-term evolutionary processes in bacteria, the strength of purifying selection, rates of recombination, and mutation profiles. He also has a strong focus in using whole genome sequencing for understanding the emergence and transmission of bacterial pathogens of humans and animals.

Homepage:

http://www.bath.ac.uk/bio-sci/contacts/academics/ed_feil/

Host Faculty



Dr. Suvendra Kumar Ray is an Associate professor in the department of Molecular Biology and Biochemistry, Tezpur University, Tezpur. His areas of research are molecular plant microbe interactions and molecular evolution.

His research on molecular evolution involves codon usage bias in bacteria.

Homepage: <http://www.tezu.ernet.in/dmbbt/>

Co-Host Faculty



Dr. Siddhartha Sankar Satapathy is an Associate Professor in the department of Computer Science and Engineering, Tezpur University, Tezpur. His research interests include computational biology and bioinformatics.

His research on molecular evolution involves understanding selection mechanisms influencing codon usage bias in bacteria.

Homepage: <http://agnigarh.tezu.ernet.in/~ssankar/index.html>

Other experts in the field are also expected to join to deliver lectures

Course Coordinator

Dr. Suvendra Kumar Ray, Department of Molecular Biology and Biotechnology

Tezpur University, Napaam-784028, Tezpur, Assam, INDIA

Phone: (+91)-3712-275406(O), +91- 9954472151(M)

E-mail: suven@tezu.ernet.in

Course Co-coordinator

Dr. Siddhartha Sankar Satapathy, Department of Computer Sc. & Engg.

Tezpur University, Napaam-784028, Tezpur, Assam, INDIA

Phone: (+91)-3712-275117(O), +91-9435979648(M)

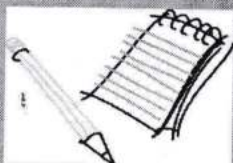


Borah
11/02/2022
Head
Department of Computer Science & Engg.
Tezpur University

Modules	Molecular evolution in bacteria: December 05–December 15, 2016 Number of participants for the course will be limited to fifty.
You Should Attend If...	<ul style="list-style-type: none"> ▪ You are college/university faculty member or scientist from research institutions and interested in genetics, molecular biology and evolution. ▪ You are a Post doc or PhD student pursuing research in molecular evolution, comparative genomics, computational biology or similar field.
Fees	<p>The participation fees for taking the course is as follows:</p> <p>Participants from abroad : US \$100 Faculty Members/Scientists/Post docs: Rs. 3000.00 (Three thousand only) PhD students: Rs. 1500.00 (Fifteen hundred only)</p> <p>The above fee includes registration fees, working lunch, all instructional materials, computer use for tutorials and assignments, computer use charges, 24 hour free internet facility. Accommodation on payment basis will be provided in Tezpur University guest house (current official rate is Rs.500/- per day for single occupancy; Rs.400/- for double occupancy and Rs.300 -per day in the dormitory of the guest house) and outstation research scholars/PG students will be accommodated in the University hostels (Current official rate is Rs. 150/- per day with bed roll).</p>



Travel Information: The university campus is about 15 km east of Tezpur town which is located on the northern bank of mighty river Brahmaputra. Tezpur is the district headquarters of Sonitpur District of Assam, and is also known as cultural capital of Assam. It is well connected with Guwahati/Dispur, the capital city of Assam, which is about 200 km from Tezpur. Guwahati, the gate way to the Northeast India is well connected through major airlines and good trains with the rest of the country. Tezpur is connected with Kolkata by Air India flights thrice a week on Tuesday, Thursday and Saturday. Private buses and ASTC buses ply frequently from Guwahati ISBT to Tezpur. Tezpur (Dekargaon) is also connected by rail through the Dekargaon-Rangapara-Kamakhya route. However, preferred mode to reach Tezpur from Guwahati is by road.



B. Boruah
 11/02/2022
 Head
 Department of Computer Science & Engg
 Tezpur University

Interested participants need to first register in the GIAN website (<http://www.gian.iitkgp.ac.in>) for a one-time registration by paying Rs. 500.00, which will enable them to enroll for any number of courses being offered under GIAN. **SUBSEQUENT REGISTRATION FOR THIS COURSE WILL HAVE TO BE DONE WITH TEZPUR UNIVERSITY BY THE SHORTLISTED CANDIDATES AFTER GETTING CONFIRMATION MAIL FROM THE COURSE COORDINATORS. They need to pay the requisite fees and fill up the registration form attached with this brochure. Duly filled in registration form can be sent to the coordinator by either**

REGISTRATION CUM ACCOMMODATION REQUEST FORM

(To be sent ONLY BY THE SHORTLISTED CANDIDATES to the course coordinators by 5th November 2016 over e-mail/speed post, ONLY AFTER GETTING CONFIRMATION E-MAIL FROM THE COURSE COORDINATOR)

**WINTER SCHOOL
ON
MOLECULAR EVOLUTION IN BACTERIA
Under Global Initiative of Academic Networks (GIAN)
December 5-15, 2016**

Name (Block Letters): M/F:

Designation/ Professional Title:

Organization:

Address:

.....

Tel.: Mobile:

E- mail:

*GIAN Course Registration Id

Accommodation Required (Yes/ No):(If YES, please select the option below)

In the University Guest House			In University Hostels
Single Occupancy <input type="checkbox"/>	Double Occupancy <input type="checkbox"/>	Dormitory <input type="checkbox"/>	<input type="checkbox"/>

The Registration fee of Rupeeshas been paid via Demand Draft No....., date.....in favour of **The Registrar, Tezpur University** through SBI online/offline banking bearing Transaction No. to SBI Tezpur Main Branch (RTGS/IFSC code: SBIN0000195) Ac. No. 30448821505 of Tezpur University. Demand Draft/ Fee Receipt have been enclosed herewith (The form also can be sent by email attachment to ssankar@tezu.ernet.in).



B. Boruah
11/02/2022

Head
Department of Computer Science & Engg
Tezpur University

Date: _____

Signature _____