

## **CusMiBio International Summer School - II<sup>nd</sup> edition 2013.**

### **Diving into molecular biology**

**CusMiBio** seeks to increase the participation of students in biological research and to encourage them to prepare for careers in research in the broad spectrum of the biological sciences from medicine, to biotechnology, ecology and bioinformatics. To this end CusMiBio organizes an **International Summer School** through which students receive training and research experience in a university setting.

The students admitted (20) will receive a week intensive hands-on experiments and seminars at the CusMiBio laboratories on the University of Milan campus. Lab activities will be supervised by scientists of Milan University, post-doc tutors and CusMiBio teaching staff. Seminars will be given by University faculty members or affiliated research organizations active in the fields of Biotechnology and Biomedicine.

At the end participants will have gained a broad up-to-date and experimental overview of nowadays biological research and they could be inspired and encouraged to take an interest in research and to consider careers in bioscience and technology.

**Period: 1-5 July 2013.**

**Application deadline: April 15, 2013**

### **Criteria for admission:**

Students age: 17 to 20 years

All activities will be in English: English proficiency is an indispensable prerequisite.

Applicants must submit the following documents by email to [cusmibio@unimi.it](mailto:cusmibio@unimi.it), (object: SummerSchool2012) by April 15, 2013:

- a completed application form (downloadable at [www.cusmibio.unimi.it](http://www.cusmibio.unimi.it))
- supporting materials (CV in EU format, a letter of presentation of their science teacher and a personal letter stating their motivation and interest in the program),
- In case of admission, receipt of payment of 250€ made to: Università degli Studi di Milano - CUSMIBIO, Intesa SAN PAOLO, IBAN IT97G0306909400000000463971.

We will review all eligible applications and select 20 students. Selection results will be notified shortly after the deadline.

### **Fees include:**

- accommodation (B&B) from June 30 to July 5 (6 nights) at an off-campus facility. The cost for 1 additional night is 30€.
- lunch tickets for the duration of the school (5 days).

- Social and cultural events from the calendar of educational and recreational activities sponsored by the Milan City Council

**Fees do not include:**

travel expenses, city transports expenses. Participants must have a traveller's medical insurance for the duration of travel (Schools may provide it) and a letter of liability (if under 18) written from one of their parents (or person in charge).

**Preliminary Program Activities:**

6 experimental activities among those run in the Try the Bioloab project ([www.cusmibio.unimi.it](http://www.cusmibio.unimi.it)). Students in small groups, under the supervision of a lead teacher and of young tutors perform hands on activities in some hot topics of genetics and biotechnology in a fully equipped University laboratory.

2 seminars given by Faculty Members

2 visits to labs or facilities equipped with large and sophisticated research instruments (confocal microscopy, X-Ray cristallography, Botanical garden).

A concluding seminar moderated by a Faculty member in which participants (groups of 5) will present one of the program activity, and discuss it in the frame of state of the art research and future perspectives/applications. Some time in the program will be devoted to the preparation of the seminar; internet access will be provided.

Social & cultural program.

<p><b>Monday</b> 9.00-13.00</p>	<p><b>Lab1 "Who is the culprit?"</b> Starting from a virtual crime scene, students will analyse on gel electrophoresis the DNA fingerprints of different defendants and of samples collected on the crime scene and identify who was present in the event.</p>
<p>14.00-16.30</p>	<p><b>Seminar 1 Forensic Genetics.</b> The application of human genetics to the resolution of legal conflicts</p>
<p><b>Tuesday</b> 9.00-13.00</p>	<p><b>Lab2 "Healthy or affected: from pedigree to genotypes"</b> Simulation of genetic counseling and prenatal diagnosis of genetic diseases by means of RFLP (Restriction Fragments Length Polymorphism) analysis. Construction of family pedigrees with autosomal dominant and recessive diseases. DNA analysis of relevant family members to recognize the mode of inheritance of the pathological alleles and the genotype of tested members and proband.</p>
<p>14.00-16.30</p>	<p><b>Lab3 "Hunting for the Cystic Fibrosis gene"</b> Online searching for genes, proteins and mutations associated with genetic disorders. Learn how scientists use genetic information in databases and to become familiar with the main tools to ask (and answer) questions about the human genome. <b>Visit1:</b> Botanical Garden "Cascina Rosa", educational and research resource for plant biology</p>
<p><b>Wednesday</b> 9.00-13.00</p>	<p><b>Lab4 "Invisible forms"</b>. Lysozyme crystals are obtained in short time and observed at light microscope; in a parallel bioinformatics module students visit one of the major protein 3D structure database and experiment how 3D models of proteins are used to obtain functional informations and to design molecules of medical relevance</p>
<p>14.00-16.30</p>	<p><b>Seminar2 DNA Barcode.</b> A new tool to identify animal and plant species.</p>

	Time devoted to the preparation of the final seminar
<b>Thursday</b> 9.00-13.00	<b>Lab5: DNA Barcode1.</b> Collection of animal and plant samples. DNA extraction and PCR amplification of barcode regions. Gel electrophoresis to analyze PCR products.
14.00-16.30	<b>Lab6: DNA Barcode2.</b> Sequence analysis: sequencing data are used to search a dedicated database to identify animal and plant species of the collected samples
<b>Friday</b> 9.00-13.00	<b>Visit2</b> CIMA, Centre for Advanced Microscopy Time devoted to the preparation of the final seminar
14.00-16.30	<b>Final Seminar</b> and concluding remarks. Students presentations

The CUSMIBIO Director

Prof. Paolo Plevani