

# ICS Summer School 2014

## Scientific Trends at the Interfaces Bioinformatics – Scientific Visualisation

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July 15th – August 8th, 2014, Roscoff - France





Science at the  
interfaces



# A multidisciplinary way of learning

Improve your curriculum

Discover the challenges of tomorrow

## Welcome to ICS Summer School

Experience a multidisciplinary way of learning, explore areas outside your major and enjoy international campus life at the UPMC Marine Station in Roscoff.

Ideally located on the Northern Brittany coast, the renowned research and training centre is jointly operated by the French National Centre for Scientific Research (CNRS) and the Pierre & Marie Curie University (UPMC).

Read more on the past Summer Schools at

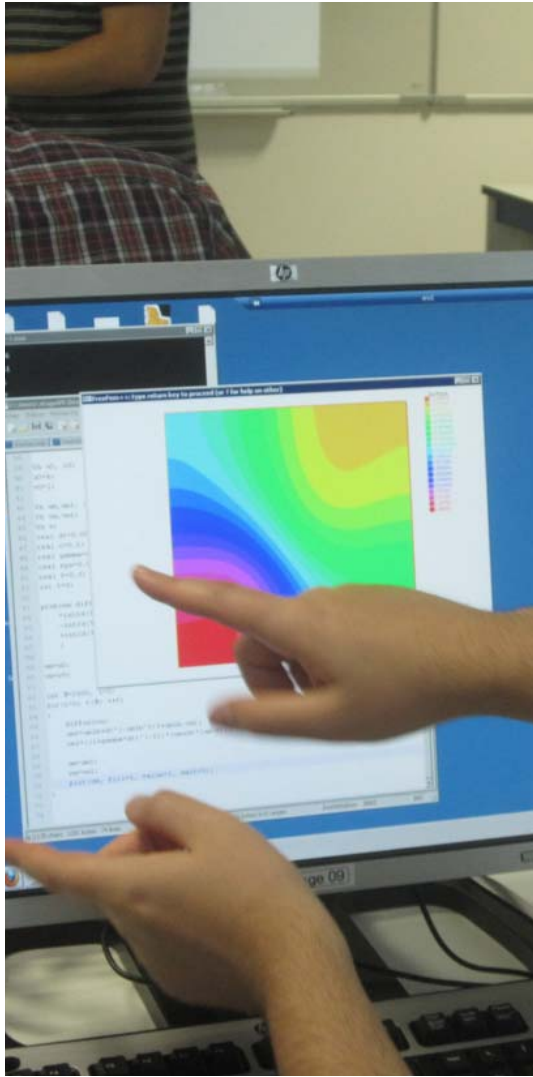
[www.ics.upmc.fr/en/events/summer\\_school.html](http://www.ics.upmc.fr/en/events/summer_school.html)

## ICS Commitment to Teaching

For talented undergraduate students who wish to broaden their experience, our unique four weeks summer program offers challenging opportunities.

We are committed to provide the best level of teaching and academic environment in view of creating a community beyond the classroom and build life lasting friendships.

Full sponsorship may be provided thanks to French state funds awarded to CALSIMLAB under the *Investissements d'Avenir* programme, reference ANR-11-IDEX-0004-02



“Interdisciplinary programmes are a unique opportunity to achieve scientific breakthroughs in numerical simulations”

Pascal Frey,  
Programme Director, ICS Summer School

## A stimulating experience

ICS invites motivated undergraduate and recent graduated students to apply.

We select students with excellent academic results and who wish to experience a different style of learning with world-class faculty.

The Summer School Programme allows students to enlarge their curriculum and explore areas at the interfaces between disciplines that are making extensive use of scientific computing and simulation.

Morning classes, afternoon tutorials and seminars by worldwide speakers are scheduled.

## Eligibility

The Summer School is for advanced Bachelor's and Master's degree (L3-M2 levels). To apply, students should have completed at least three years of university studies.

## Scholarships

A limited number of full/partial scholarships is available. A full scholarship covers tuition fees, accommodation in Roscoff and expenses to travel from Paris.

## Language requirements

Students from all over the world are encouraged to apply.

All courses are taught in French or English, depending on the audience. Applicants are expected to be fluent in either language in order to follow the lectures and participate to classrooms discussions.

## Accommodation

All Summer School students have the opportunity to live on campus hotel, space permitting. Breakfast, lunch and evening meals (except on Saturdays and Sundays) are included.

## Application and registration

To secure your participation, we advise you to apply as soon as possible.

The application form can be downloaded from the ICS web site:

[www.ics.upmc.fr/en/events/summer\\_school.html](http://www.ics.upmc.fr/en/events/summer_school.html)

# 2014 Summer School Programme

The 4 weeks programme covers two active research topics:

Term I - 15-25 July: **Bioinformatics**

Term II - 28 July – 8 August: **Scientific visualization**

Summer School Terms I and II are interdisciplinary courses and can be taken independently: students may enrol for either or both, however they are encouraged to take both. The courses consist of morning plenary sessions, afternoon numerical simulation hands-on activities and evening lectures.

**During this training programme, students will discover several aspects of state of the art and current research in bioinformatics and scientific visualization and will get a thorough introduction to the underlying mathematical and computational methods applied to these challenging topics.**

**Term I: Bioinformatics is the application of computer science and information technology to the field of biology and medicine.**

Bioinformatics primarily focuses on developing computationally intensive techniques to increase the understanding of biological processes. This involves dealing with algorithms and computation theory, artificial intelligence, image and signal processing, discrete mathematics, control and system theory, databases and information systems, and statistics.

**Term II: Scientific visualisation is a booming area that helps to advance knowledge at the interfaces of disciplines.**

With nowadays complex numerical simulations, scientists are in need for abstract, general-purpose methods of analysis to improve their understanding of the phenomena that have been simulated. Real-time interactive visualization can serve as interpretation, help building hypothesis and reasoning. Active research areas in this topic involve information theory, computer graphics, mathematics, physics, and cognitive science.

This advance training is open to young and brilliant scientist students (Licence L3, Master M1, M2) and does not specifically require prior knowledge in bioinformatics or scientific visualization, other than a solid 3-years scientific university background.

**The number of participants is limited.**

To benefit from this training, students need to have a strong desire to learn and understand new concepts. There will be ample time for filling some gaps in understanding. Instructors will be happy to exchange with the students, either in individual discussions or during the tutorial sessions.

## Keynote Speakers and Supervisors

**Marc Baaden**, *Director of Research at CNRS, Institute of Biology, Physics and Chemistry*

**Alessandra Carbone**, *Professor at Université Pierre et Marie Curie*

**Chunlong Chen**, *Researcher at CNRS, Center of Molecular Genetics*

**Jacques Chomilier**, *Director of Research at CNRS, Université Pierre et Marie Curie.*

**Jérémy Foulon**, *Research Engineer at Université Pierre et Marie Curie*

**Pascal Frey**, *Professor at Université Pierre et Marie Curie*

**Hervé Isambert**, *Director of Research at CNRS, Laboratory of Physics and Chemistry, Institut Curie*

**Élodie Laine**, *Associate Professor at Université Pierre et Marie Curie*

**Joseph Lucas**, *Engineer in Bioinformatics at École Normale Supérieure de Paris*

**Chantal Oberson-Ausoni**, *Researcher at Université Pierre et Marie Curie*

**Hugues Roest Crollius**, *Director of Research at CNRS, École Normale Supérieure de Paris*

**Claude Thermes**, *Director of Research at CNRS, Center of Molecular Genetics*

**Julien Tierny**, *Researcher at CNRS, Telecom Paris Tech*



## Plenary lectures

Plenary lectures are held every morning on weekday and will propose talks on a wide range of topics of importance for Bioinformatics and Scientific Visualization: from basic concepts to advanced high performance computing techniques.

Full details about the lecturers and speakers will appear in the daily timetable you receive upon registration.

## Hands-on simulations

These afternoon sessions are meant to be interactive, educational and, possibly fun.

They will provide various insights and concrete experiences with educational software packages.

Students will be encouraged to develop their intuition and skills by interacting with experienced users in a user-friendly environment. Under the guidance of experts, participants will play and learn by doing.

Students are encouraged to assist and participate actively.

## Evening lectures

During the sessions, a few topic-related lectures will take place on evenings, given by invited speakers and faculty members.

These sessions are aimed to enhance your understanding and enjoyment of the programme. Speakers are experts in their field: senior figures from within and beyond the University, Course Directors, and Guest Lecturers from industrial research centres.



## Institute for Scientific Computation and Simulation

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