ISCD Summer School 2019

Scientific Trends at the Interfaces

Visual data analytics

Organisers: Julien Tierny, Pascal Frey

July 15th – August 9th, 2019, Roscoff - France

Science at the interfaces

A multidisciplinary way of learning

Improve your curriculum

Discover the challenges of tomorrow

Welcome to ISCD 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 Sorbonne Université (SU).

Read more on our Summer Schools Programme at:

iscd.upmc.fr/training/summer-school

ISCD Commitment to Teaching

For talented undergraduate and graduate students who wish to broaden their experience, our unique four-week 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

SORBONNE UNIVERSITÉ
CRÉATEURS DE FUTURS
DEPUIS 1257

Students working on an educational task with YASARA software (Wikimedia Commons)

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

Pascal Frey,
Programme Director, ISCD Summer School

A stimulating experience

ISCD invites motivated undergraduate and graduate 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/projects and seminars by worldwide speakers are scheduled.

Eligibility

The Summer School is for advanced Bachelor's and Master's degree (L3 to 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, and accommodation in Roscoff.

Language requirements

Students from all over the world are encouraged to apply.

All courses are taught in 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. 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.
Application form is on the ISCD web site:
iscd.upmc.fr/training/summer-school/applications/
and must be uploaded on the web site.

Contact : training_iscd@upmc.fr

2019 Summer School Programme

The purpose of these 4 weeks of training is to introduce the mathematical and numerical basics of scientific visualisation and data analysis.

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 scientific visualization and data science and will get a thorough introduction to the underlying mathematical and computational methods applied to these challenging topics.

Scientific visualization 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.

Data science is a multidisciplinary emerging field that aims at extracting knowledge from data.
Data science is based on theories and techniques from mathematics, applied statistical analysis, information science, computer science, including machine learning, information processing, statistical learning, data mining, etc. It impacts almost all domains and application areas including medical sciences, biological studies, social sciences and humanities.

This advance training is open to young, brilliant students (Master (M1 or M2), first years of PhD, excellent L3 students). No specific prior knowledge besides a solid undergraduate scientific background is required. This multidisciplinary program aims at attracting students from different curricula.

To benefit from this program, students need to have a strong desire to learn and understand new topics. There will be ample time for filling some gaps in the different disciplines. Instructors will be happy to give further explanations, either in face-to-face discussions or during the tutorial sessions.

The main areas that will be covered include:

- Basic information theory
- Mathematical methods for topological analysis
- Computer graphics and advanced rendering techniques
- Basics of statistical data analysis and machine learning
- Deep learning introduction
- Introduction to Python programming
- Introduction to R & Shiny

Keynote Speakers and Supervisors

Michaël Aupetit, *scientist at Qatar Computing Research Institute*
Pascal Frey, *professor at Sorbonne Université*
Fabrice Rouillier, *senior researcher at Inria-IMJ-Sorbonne Université*
Filip Sadlo, *professor at Heidelberg University*
Julien Tierny, *researcher at CNRS – Sorbonne Université*
Fabien Vivodtzev, senior researcher at CEA-CESTA Bordeaux

Plenary lectures

Plenary lectures are held every morning on weekdays and will cover a wide range of topics of importance for Computational Chemistry: from basic linear algebra, numerical methods, mathematical models for chemistry, to advanced multi-scale modelling and high-performance computing techniques.

Full details about the lecturers and speakers will appear in the daily timetable emailed after registration.

Hands-on simulations

The 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 participate actively.

Evening lectures

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

These sessions aim 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 Computing and Data Sciences

Sorbonne Université – Campus Pierre et Marie Curie
Case courrier 380
4, place Jussieu, 75252 Paris cedex 05, France
iscd.upmc.fr

INSTITUT DES SCIENCES DU CALCUL ET DES DONNÉES
ISCD
SORBONNE UNIVERSITÉ