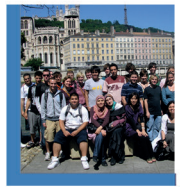




IPL INTERNATIONAL SUMMER SCHOOL

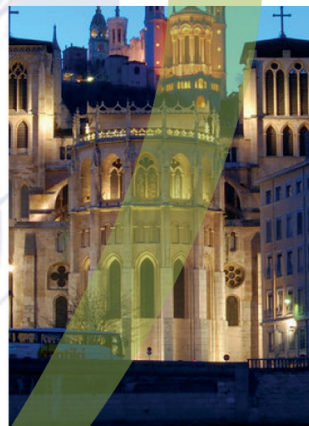
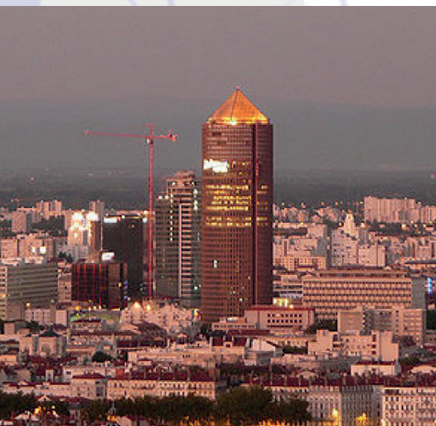
IN SCIENCE AND ENGINEERING IN FRANCE

LYON, THURSDAY JUNE 10, 2021 TO JULY 13, 2021



**Enjoy a truly international experience in a French Grande Ecole !
Improve your French language proficiency and your scientific knowledge at the same time.**

The IPL International Summer School gives you a unique opportunity to experience the French higher ed. environment and also to meet students from all over the world. The 5-week programme, jointly organised by the four IPL engineering schools, offers scientific courses in English as well as French language classes. The Summer School also aims to give all participants an opportunity to discover different facets of life in France both in Lyon and the Rhône-Alpes Region through organised excursions.

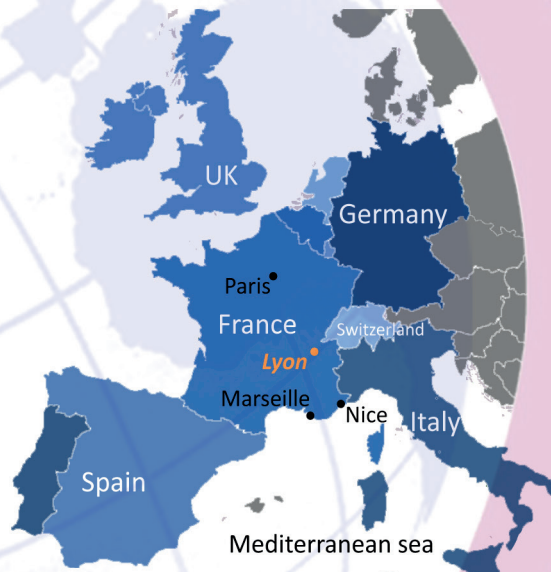


Comments of the 2020 session participants :

"I would like this program to continue so I could send my kids to it one day. :)"

" I found this program by chance while browsing through my school's exchange programs. It is one of the best decisions I have made"

"I had a wonderful 5 weeks and loved learning about and experiencing the French culture !"



What does the program contain ?

40 hours of French Language instruction according to entry level: beginner, intermediate, advanced. Scientific courses in the specialties of the IPL engineering schools, industrial visits and cultural outings. Scientific courses will be offered **in English** in the following topics :

CPE Lyon : Practical and theoretical courses in digital sciences for chemical engineers : Internet of Things (IoT), Data acquisition, Data Analysis, Networks, Big data, Sensors, Distributed Systems, Software Development, Artificial Intelligence, Machine Learning.

ECAM Lyon : Energy and Sustainability : Most of the biggest challenges we will have to face in the future (global warming, increasing scarcity of fossil fuels, the impact of production methods and materials, etc.) are related to the production of energy, its use and consequences. The goal of this course is to teach future engineers the industrial and regulatory context, the technical concepts and tools needed to comprehend these challenges and explore the solutions of tomorrow.

ISARA Lyon : Develop knowledge in Agroecology and Alternative food systems in France. "Cro ping systems and breeding systems, sustainable management of agroecosystems, biodiversity management, food system analysis. Lectures, excursions, case studies and personal research on these themes.

ITECH Lyon : Discover an original and practical approach of Polymer and Material Sciences engineering : practicals on paint, adhesive and cosmetic formulation, textile dyeing and weaving process, leather and plastic.

Who is it for ?

Undergraduate students in Science and Engineering.

What will you get from the Summer School ?

Energy It is a wonderful opportunity to get to know France and its culture. You may then want to come back for a full semester in one IPL school. European Credits (ECTS) upon successful completion of the programme according to the school of your choice.

Where will you stay ? In a residence hall

When does the Summer Session take place in 2021 ? The programme begins on **Thursday June 10, 2021** and ends on **Wednesday July 13, 2021**. Arrival on **Thursday June, 10** and departure on **Wednesday July, 13**.

How much does it cost ? 2150 €* including all classes, 5-week accommodation in a residence hall, all visits and social events, public transport card and a dedicated program coordinator. * except for ISARA non partner universities, in that case contact sverneret@isara.fr

When and how to register ? By April, 16th 2021. Please complete the application form on the dedicated web site. Upon confirmation of admission, payment instructions will be given to you.

Full details of Summer School on
www.iplsummerschool.com



Contacts

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IPL Summer School 2021

The Fundamentals of Digital Science for Chemists

Dr. John SAMUEL
Dr. Oscar CARRILLO

<p>14/06/2021 9h-12h (OCA) 1. Internet of things</p>	<p>Objective: This part gives an introduction to different themes related to Internet of things required for chemists</p> <p>It will cover the following topics:</p> <ul style="list-style-type: none"> • History of Internet of Things (IoT) • Definition of IoT • Industry 4.0 • IoT architectures • Fog/Edge/Cloud computing
<p>15/06/2021 9h-12h (JSA) 2. Introduction to Data Science</p>	<p>Objective: This part is an introduction to different themes related to data science required for chemists</p> <p>We will take a look at different concepts related to data science</p> <ul style="list-style-type: none"> • History of Data Science and computing • Computer Architecture and Systems • Major phases of data analysis • Algorithms for data acquisition and process control
<p>16/06/2021 9h-12h (OCA) 3. Data acquisition protocols and technologies for IoT</p>	<p>Objective: This part presents data acquisition protocols and technologies for IoT</p> <p>We will take a look at the key concepts of IoT</p> <ul style="list-style-type: none"> • IoT Technologies • Data acquisition protocols like SPI, I2C • Sensors • Actuators
<p>22/06/2021 9h-12h (JSA) 4. Fundamentals of Programming</p>	<p>Objective: This part gives a general overview of programming in Python with the goal of using it for data analysis</p> <p>The student will be able to get an overview of</p> <ul style="list-style-type: none"> • Fundamentals of Python programming • Manipulation of files, especially reading, writing and modifying text files and CSV/TSV and JSON files • Interaction with the user • Data Analysis (basic) using built-in Python methods
<p>22/06/2021 13h-17h (JSA) 5. Data Analysis and visualization</p>	<p>Objective: This part gives the fundamentals of data analysis and visualization</p> <p>It will cover the following topics</p> <ul style="list-style-type: none"> • Clustering algorithms • Classification algorithms • Linear regression models • Recommender systems

	<ul style="list-style-type: none"> • Visualization techniques
23/06/2021 9h-12h (OCA) 6. Practical session on Microcontrollers	<p>Objective: This part gives a hands-on experience on the microcontrollers</p> <p>The student will be able to perform the following</p> <ul style="list-style-type: none"> • Coding, compiling and flashing a firmware for microcontroller • Interacting with sensors and actuators using SPI and I2C protocols • Reading digital and analog measures
23/06/2021 13h-17h (OCA) 7. Network protocols for IoT	<p>Objective: This part gives an introduction to the network protocols for data communication</p> <p>We will cover the following topics</p> <ul style="list-style-type: none"> • Network protocols like LPWAN and WPAN • Message exchange protocols like MQTT
28/06/2021 9h-12h (JSA) 8. Data Mining	<p>Objective: This part gives an opportunity to the students to use data mining tools</p> <p>We will look at the following topics:</p> <ul style="list-style-type: none"> • Introduction of Python libraries like numpy, matplotlib and pandas • Manipulating CSV and JSON files using the above libraries • Data analysis • Data visualization techniques for different types of data • Clustering, classification and linear regressing using the library Scikit-learn.
30/06/2021 9h-12h (OCA) 9. Scaling up IoT	<p>Objective: This part introduces ways to scale up the IoT architectures</p> <p>The students will discover</p> <ul style="list-style-type: none"> • The challenges while scaling up IoT • IoT Lab infrastructure
01/07/2021 9h-12h (JSA) 10. Machine Learning	<p>Objective: This part gives an introduction to machine learning techniques</p> <p>We will cover the following topics</p> <ul style="list-style-type: none"> • Supervised, unsupervised and semi-supervised learning • Neural network models including single and multilayered perceptron

	<ul style="list-style-type: none"> • Analysis of sensor data • Image analysis • Prediction • Recognition of handwriting
05/07/2021 9h-12h (OCA) 11. Practical session on IoT-Lab	<p>Objective: This part introduces ways to use message and network protocols for IoT lab</p> <p>The students will work on</p> <ul style="list-style-type: none"> • LoRa WAN • MQTT
07/07/2021 9h-12h (JSA) 12. Big Data	<p>Objective: This part wil introduce the key concepts of Big Data</p> <p>Following are the topics covered in this module:</p> <ul style="list-style-type: none"> • 5V of Big Data • Data storage of voluminous data, especially non-relational databases • Artificial Intelligence • Open databases and extraction of information
08/07/2021 9h-11h (OCA-JSA) Evaluation	Final exam of two hours based on all the topics covered in this module.