Bordeaux INP
AQUITAINE

Give engineering a French touch


Summer School Bordeaux INP

SUSTAINABLE DEVELOPMENT IN METROPOLITAN BORDEAUX

July 3rd to 13th, 2017

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Bordeaux INP
AQUITAINE

Give engineering a French touch

ENSC - Bordeaux INP
COGNITICS

ENSCBP - Bordeaux INP
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FOOD SCIENCES
MATERIALS

ENSEGID - Bordeaux INP
ENVIRONMENT
GEOLOGICAL RESOURCES
WATER RESOURCES

ENSEIRB-MATMECA - Bordeaux INP
ELECTRONICS
COMPUTER SCIENCES
TELECOMMUNICATIONS
MATHEMATICS & MECHANICS

ENSTBB - Bordeaux INP
BIOTECHNOLOGIES

ENSGTI*
ENERGETICS
CHEMICAL ENGINEERING

ISABTP*
CIVIL ENGINEERING

LA PRÉPA DES INP
SCIENTIFIC PREPARATORY COURSE

*partner schools

17 programs including **5** by apprenticeship

2 900 students

230 faculty members

+900 graduates each year

12% international students

10 joint research centers

130 partnerships worldwide

Bordeaux INP is a member of the Groupe INP

4 institutes in France
30 graduate schools of engineering
21 000 students
1 out of 7 engineers graduate from the Groupe INP in France.

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A word from François CANSELL

Director general of Bordeaux INP

On behalf of all colleagues, I am pleased to welcome you to Bordeaux, one of the most dynamic conurbations in France, on top of the most attractive destinations in 2017.

We are happy to receive you at Bordeaux INP graduate school, the academic institution promoting the training of engineers in the South-Western part of France. Over the past three years we have worked very hard to develop the Bordeaux INP Summer School into what it is today. We now offer a two-week program designed to provide new knowledge and insights in sustainable development that may be needed in your future career. This particular theme has been a focus of concern for our institute for a number of years now.

Our summer course will include seminars and visits of industrial sites, and will be taught in English. Our experts will address the main challenges in relation with sustainable development and the consequences of global warming. We will give the floor to scientists and also to professors in charge of a number of innovative programs which better mobilize the academic and scientific actors, in order to enable more efficient and more visible development of policies, capacity and instruments relating to education, training and research for sustainable development. We would also like to acknowledge the valuable contribution of Bordeaux Metropole who will show how the city has implemented a series of initiatives to become greener and provide a better quality of life for all its citizens, Yves Parlier (Beyond the Sea) and Veolia.

Alongside the program we also offer exciting social activities which will show you the highlights of student life in Bordeaux. By its exceptional geography, historic heritage and the worldwide reputation of its gastronomy and wines, our city embodies a timeless way of life. We hope you will enjoy the city, its emblematic buildings as well as our brand new Bordeaux-based wine museum and cultural center known as La Cité du Vin which recently opened its doors. You will also discover the dynamism of the city which makes it attractive, in particular thanks to the new LGV line which now connects the city with Europe's high-speed train network and cuts travel time to Paris from three to two hours.

I wish you a very pleasant stay with us.

François Cansell
Director general of Bordeaux INP

Timetable

Monday, July 3rd

9:00 **Welcome Breakfast**
François Cansell, Director general of Bordeaux INP
Claire Le Henaff, Delegate for International Affairs

10:00 **Overview of the summer school**
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

11:00 **French** *with Marie-Pierre Eugène*
Salle TD28 - ENSEIRB-MATMECA - Bordeaux INP

12:15 **LUNCH (CROUS)**

1:30 **The UN Agenda for 2030 on Sustainable Development**
Michel Ricard (ENSEGID-Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

3:30 **BREAK**

3:45 **Can rising CO_2 concentration in the atmosphere mitigate the impact of drought years on tree growth ?**
Jean-Christophe Domec (Bordeaux Sciences Agro)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

6:00 **WINE & CHEESE**
ENSEGID - Bordeaux INP

Tuesday, July 4th

9:00 **French**
Salle TD28 - ENSEIRB-MATMECA - Bordeaux INP

12:15 **CULINARY WORKSHOP (KWEEZINE)**

3:00 **VISIT : Cité du vin (Wine Museum)**

Wednesday, July 5th

9:00 to 5:00 **Day at** BORDEAUX MÉTROPOLE

Thursday, July 6th

9:00 **French**
Salle TD28 - ENSEIRB-MATMECA - Bordeaux INP

10:00 **Sustainable Management of Groundwater**
Alexandre Pryet (ENSEGID -Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

12:15 **LUNCH (CROUS)**

1:30 **Sustainable Wood Production of the Landes de Gascogne Maritime Pine Forest**
Florian Delerue (ENSEGID -Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

3:30 **BREAK**

3:45 **Life Cycle Assessment**
Philippe Loubet (ENSCBP-Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

Friday, July 7th

9:00 **French**
Salle TD28 - ENSEIRB-MATMECA - Bordeaux INP

10:00 **Electric consumption and human behaviors at home**
Jean-Marc Salotti (ENSC - Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

12:15 **LUNCH (SANDWICHES)**

3:00 **Beyond The Sea by Yves Parlier (La Teste)**

Monday, July 10th

9:00 **Departure from Bordeaux INP**

10:00 **VISIT : Château Boutinet (Villegouge)**

12:00 **LUNCH (SANDWICHES)**

2:00 **VISIT : Centre d'Enfouissement des Déchets, Lapouyade**

Tuesday, July 11th

9:00 **French**
Salle TD28 - ENSEIRB-MATMECA - Bordeaux INP

10:00 **Wave-based resonant microsensors for environmental applications**
Corinne Dejous (ENSEIRB-MATMECA - Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

12:15 **LUNCH (CROUS)**

1:30 **« Energy transition. Potential role and challenges of energy storage. »**
Jean-Pierre Bedecarrats (ENSGTI)*
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

3:45 **Domestic wastes : characteristics, waste prevention and social representation**
Sandrine Courvoisier (ENSEGID - Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

Wednesday, July 12th

9:00 **French**
Salle TD28 - ENSEIRB-MATMECA - Bordeaux INP

10:00 **Recent development in photovoltaic cells**
Laurence Vignau (ENSCBP-Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

12:15 **LUNCH (CROUS)**

1:30 **Future of communications : faster, smarter, greener**
François Rivet (ENSEIRB-MATMECA - Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

7:30 **FAREWELL DINER**

Thusday, July 13th

9:00 **French**
Salle TD28 - ENSEIRB-MATMECA - Bordeaux INP

10:00 **Restitution worshop / presentation of certificates**
Antoine Legrand (Bordeaux INP) & Mathieu Breton (ENSCBP - Bordeaux INP)
Amphi G - ENSEIRB-MATMECA - Bordeaux INP

12:00 **LUNCH (CROUS)**

2:00 **Visit of labs**

Friday, July 14th  BASTILLE DAY 

*partner schools of Bordeaux INP

Michel RICARD

Michel RICARD is an emeritus professor in Ecology and Sustainable Development at ENSEGID-Bordeaux INP. He is in charge of the UNESCO chair « Education, training and research on sustainable development » and president of the French digital university in Ecology and Sustainable Development – UVED.

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Bordeaux INP ENSEGID

The United Nations Agenda for 2030 on Sustainable Development : 17 Goals to Transform our World

In 2015, United Nations countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals. The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.

These 17 Goals build on the successes of the Millennium Development Goals, while including new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities. The goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another.

The SDGs work in the spirit of partnership and pragmatism to make the right choices now to improve life, in a sustainable way, for future generations. They provide clear guidelines and targets for all countries to adopt in accordance with their own priorities and the environmental challenges of the world at large. The SDGs are an inclusive agenda. They tackle the root causes of poverty and unite us together to make a positive change for both people and planet. The introductory lecture will replace this Agenda in the continuity of numerous initiatives led by United Nations and its Agencies for over 60 years.

JULY, 3 - 1:30 P.M.

Jean-Christophe DOMEC

Jean-Christophe DOMEC is a Professor in wood anatomy and tree ecophysiology at Bordeaux Sciences Agro. He is a researcher in the UMR ISPA « Interactions Sol Plante Atmosphère » INRA/ Bordeaux Sciences Agro.

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Can rising CO_2 concentration in the atmosphere mitigate the impact of drought years on tree growth ?

Atmospheric CO_2 concentrations and nitrogen deposition rates have increased substantially over the last century and are expected to continue unabated. As a result, terrestrial ecosystems will experience warmer temperatures and some may even experience droughts of a more intense and frequent nature that could lead to widespread forest mortality. Thus there is mounting pressure to understand and predict how forest growth will be affected by such environmental interactions in the future. In this lecture we used tree growth and physiological data from the Duke Free Air CO_2 Enrichment (FACE) experiment to discuss the effects of elevated atmospheric CO_2 concentration (+200 ppm) and Nitrogen fertilization (11.2 g of N m^{-2} yr^{-1}) on stem biomass increments, water use and carbon uptake of mature trees from 1996 to 2012.

JULY, 3 - 3:45 P.M.

Alexandre PRYET

Alexandre PRYET is Assistant Professor in Groundwater Hydrology at ENSEGID-Bordeaux INP. His research projects focus the sustainable development and protection of groundwater resources.

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Bordeaux INP
ENSEGID

Sustainable management of groundwater resources

Groundwater is extensively used for irrigation and drinking water supply. In comparison with surface waters, subterranean water resources are of better quality and are resilient to climate fluctuations. Victim of its own success, this valuable resource is now threatened by depletion in numerous regions of the world. In this lecture, we present a framework to assess the degree of sustainability of groundwater withdrawals.

JULY, 6 - 10 A.M.

Florian DELERUE

Florian DELERUE is a senior lecturer in ecology at ENSEGID-Bordeaux INP.

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Sustainable Wood Production of the Landes de Gascogne Maritime Pine Forest

The « Landes de Gascogne » forest of maritime pine is the largest cultivated forest in Europe. During the last decades, wood production in this forest has largely increased thanks to profound changes in forestry practices. Nowadays, the demand for wood production is still increasing. However, as we will see in this lecture, satisfying this demand raises the question of the sustainability of such level of production. Pine trees grow on nutrient poor sandy soils. Thus, increasing wood production in the short term could jeopardize soil nutrient stocks and wood production in the long term. Finally, we will see that perspectives regarding climate change have also to be taken into account to ensure wood production in the region on the long term.

JULY, 6 - 1:30 P.M.

Philippe LOUBET

Philippe LOUBET is an associate Professor in environmental evaluation at ENSCBP-Bordeaux INP. His research focuses in the improvement of the Life Cycle Assessment (LCA) methodology and its application to Green Chemistry, Agri-Food and Water Management.

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ENSCBP

Life Cycle Assessment (LCA) : a holistic approach to assess the environmental impacts of products

A product, or a service, generates environmental impacts through all its life cycle stages, i.e., from raw material extraction through materials processing, manufacture, distribution, use and disposal or recycling. These impacts are diverse as they refer to pollution (global warming, toxicity, eutrophication, acidification, etc.) or resources use (fossil and metal depletion, water deprivation, etc.).
In order to ensure sustainable production, decision makers need tools to quantify these impacts in a holistic way. In this context, LCA is an efficient method that enables to assess most of the environmental impacts of a product from cradle to grave. It allows identifying pollution shifting between impact categories, between life cycle stages or between different locations.This lecture will introduce the main concept of LCA, its application for eco-design, environmental labeling, industrial ecology and so on. Examples within the French or Aquitaine context will also be presented.

JULY, 6 - 3:45 P.M.

Jean-Marc SALOTTI

Jean-Marc SALOTTI is Professor at ENSC - Bordeaux INP, and member of the «Intégration du Matériau au Système» laboratory (IMS - Bordeaux INP, university of Bordeaux, CNRS). He is specialized in artificial intelligence and cognitive human engineering with applications in the habitat domain, in collaborative robotics and in manned space missions.

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Bordeaux INP
ENSC

Electric Consumption and Human Behaviors at Home

In France, domestic electric consumption represents 70% of the total consumption. The current trend is to use technological tools to reduce that consumption. However, real consumptions are far from expectations because of habits, poor user-friendrly interfaces, inappropriate tools and other human factors reasons. This course provides some keys to understand the main issues.

JULY, 7 - 10 A.M.

Corinne DEJOUS

Corinne DEJOUS is a Professor at ENSEIRB-MATMECA – Bordeaux INP. She carries out her research on bio/chemical microsensors. At IMS Lab, she is head of the research group « Waves » and, since 2016, she has been in charge of the large project (GPU) on Environments.

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Wave-based resonant microsensors for environmental applications

Quality / contamination of drinking or beach water, of indoor or outdoor air, of soil or food products, sustainable agriculture… environment and environmental health are big issues for microsensors, with an urgent need for high sensitivity, and most of all high selectivity. Surface Acoustic Wave devices, as well as radio-frequency and optical microsensors are presented as promising devices. Integrated with nano-structured sensitive advanced materials, they can address a large spectrum of applications. Together with recent topics on the development of flexible devices with friendly-printed technologies and wireless solutions for micro-energy, this leads us to perspectives in wireless sensing networks.

JULY, 11 - 10 A.M.

Jean-Pierre BEDECARRATS

Jean-Pierre Bédécarrats is a full professor at the ENSGTI which is an engineering school specialized in industrial technology. He teaches heat transfers, applied thermodynamics and energy storage. He is also director of the Laboratory of Thermal energy, Energetics and Processes (LaTEP).
After carrying out a PhD on the supercooling (delay at the liquid-solid transition) of the Phase Change Materials (PCMs), he works on the various applications of PCMs and especially on the latent heat energy storage. He also worked on Ice slurries composed of ice crystals dispersed in an aqueous solution as secondary refrigerants used in indirect cooling systems. His research activities, begun more than 20 years ago, constituted of experimental and numerical studies, have allowed him to specialise in the field of the solid–liquid phase change and energetic systems.

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Energy transition. Potential role and challenges of energy storage.

Energy transition is driven by the demands of development combined with the constraints posed by climate change and energy supplies. Over the last few years, a lot of countries have seen many significant changes in energy use. Energy transition is made possible by improved technologies which are generally flexible regarding the fuels that can be used, and which offer significant efficiency improvement in many cases.
This presentation examines the energy transition in developed countries and in France in particular. The analysis focuses on the provision of energy services to consumers. The factors that led to the replacement of one fuel by another, or one technology by another, are discussed, as well as the overall market conditions that led themselves to energy transition. The use of renewable energies is highlighted. The analysis also explores instances in which storage technologies are essential. A particular focus will be made on heat storage technologies which are one of the solutions to develop the use of intermittent sources of renewable energies.

JULY, 11 - 1.30 P.M.

Sandrine GOMBERT-COURVOISIER

Sandrine COURVOISIER-GOMBERT is a lecturer in Ecology/Human ecology at ENSEGID-Bordeaux INP. She is a researcher in the UMR ADES.

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Domestic wastes : characteristics, waste prevention and social representation

By their consumption patterns, households generate wastes (biodegradable wastes, cartons, papers and plastics
due to packaging, glass, textiles, electrical and electronic equipment waste, ….). In 2005, the French production of domestic waste reached 1kg/inhabitant/day.
Although waste management has become increasingly sophisticated, separate collection and recycling facilities have become commonplace, and landfill and incineration standards have become more rigorous, rising global consumption patterns are putting increasing pressure on natural resources, ecosystems and waste infrastructure.
That is why the European Waste Directive (2008/98/EC) introduces waste prevention at the top of the waste hierarchy and considers it as the favoured option. However, although waste policy aims encouraging behavioural change, changes towards proenvironmental behaviours are still low due to psychological barriers.
The course will deal with domestic waste, waste prevention and waste perception and obstacles to behavior changes.

JULY, 11 - 3:45 P.M.

Laurence VIGNAU

Laurence VIGNAU is a Professor at ENSCBP-Bordeaux INP. She carries out her research on Organic Electronics at the Laboratory of the Interaction from Materials to Systems (IMS - Bordeaux INP, university of Bordeaux, CNRS)

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Recent development in photovoltaic cells

Currently, around 80% of the energy supply worldwide is based on fossil fuels like coal, oil or gas. Renewable energies represent the key to greater independence from fossil fuels. Up to now, only a very small percentage of the energy production comes from the sun, mainly because of the relatively high cost of the silicon-based solar cells. Organic photovoltaic cells are viewed as promising candidates for low cost solar cells because of the possibility of a production on flexible and large-area substrates by solution processing that should dramatically reduce the manufacturing costs. The talk will present all types of photovoltaic cells and will focus on Organic Solar Cells.

JULY, 12 - 10 P.M.

François RIVET

Dr. Francois RIVET received the phD degree in 2009 from the University of Bordeaux, France. He joined the French Research Agency (CNRS) in 2005 as a PhD student in the microelectronics laboratory of the University of Bordeaux. His research is focused on the design of RFICs. He developed a Sampled Analog Signal Processor (SASP) dedicated to Software Radio applications. He is a member of the STMicroelectronics-IMS joint research laboratory, and of several Technical Program Committees (RFIC, MWSCAS, SBCCI, …). In February 2010, he co-founded as CEO, Atlantic Innovation – Electronic Solutions. His company is specialized in research in any electronic topics. Since June 2010, he is tenured as Associate Professor at IMS Lab and Bordeaux INP.

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Future of communications : faster, smarter, greener

How does my smartphone works ? Why am I running out of battery within a day ? Why my communications can be so slow... This lecture will introduce you to the challenges in telecommunications by drawing researches perspectives in the coming future for faster, smarter and greener handsets. We will discover the evolution of telecommunications, how a circuit is design and fabricated, why it consumes so much power and how we can solve these issues by proposing disruptive solutions. Cellphone use will be allowed during presentations !

JULY, 12 - 1:30 P.M.

Marie-Pierre EUGÈNE

Marie-Pierre EUGÈNE works freelance as a French language teacher at INP Bordeaux. She teaches mainly at Université de Bordeaux and Université Montaigne de Bordeaux. In addition to general French, she also gives courses in French for special purposes in the legal and scientific domain to students from a variety of different backgrounds. Some are from the traditional academic sector (the Erasmus programme & PhD students), while others are refugees and or adults attending evening courses.

NOTES

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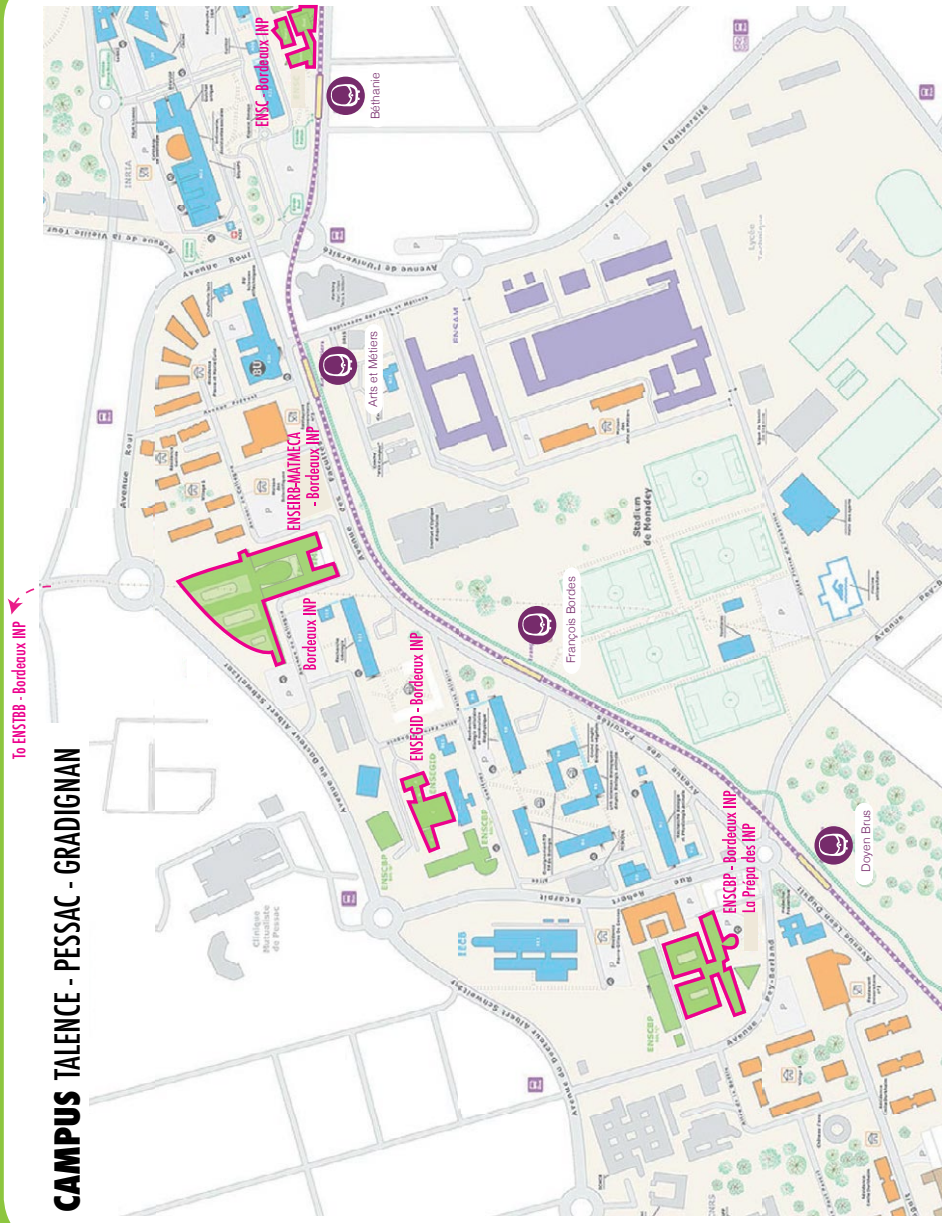

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