



Intensive Program

*Innovative Teaching by Research
and Laboratory Classes*

Lille, 3-7 April 2017

Schedule :

Monday 3rd April 2017		
10.30 AM	Registration	ENSCL, Main entrance
11 AM	Welcoming	ENSCL, room 125, 1st floor
11.30 AM	Lunch	University Restaurant "Le Barrois"
1.30 PM	Session 1	ENSCL, room 125, 1st floor
5 PM	End	
Tuesday 4th April 2017		
9 AM	Session 2	École Centrale de Lille, room Bossut, administration building <i>See map of the campus</i>
11.30 AM	Lunch	University Restaurant "Le Barrois"
1 PM	Session 3	Building C3, meeting room, ground floor
5 PM	Visit of the old town "Vieux Lille"	Meeting in the centre of Lille, Office de Tourisme de Lille, metro station : Rihour
7 PM	End	
Wednesday 5th April 2017		
9 AM	Session 4	ENSCL, computer room, first floor
12.30 PM	Lunch	University Restaurant "Le Barrois"
2 PM	Visit of "Cristallerie d'Arques"	Round trip in bus. Meeting at 2 PM in the main entrance of ENSCL. Return to the centre of Lille at 7.15 PM.
7.30 PM	Dinner	Restaurant "Estaminet Gantois", Lille See map attached, meeting in front of the restaurant at 7.30
10 PM	End	
Thursday 6th April 2017		
9 AM	Session 5	ENSCL, room 125, 1st floor
11.30 AM	Lunch	University Restaurant "Le Barrois"
1.30 PM	Coordination meeting/ New Erasmus project: 4 LABS	ENSCL, room 125, 1st floor
5.30 PM	End	
Friday 7th April 2017		
9 AM	Final remarks	ENSCL, room 125, 1st floor
11.30 AM	Lunch	University Restaurant "Le Barrois"

Program :

Monday 3rd April

10h30-11h00 : Registration/ Coffee break

11h00-11h30 : Welcoming - Rose Noëlle Vannier, Director of ENSCL ; Zahia Turpin, Head of International Relations of ENSCL

11h30-13h00 : Lunch

13h30-14h30 : Presentation of technical platforms : Centre Commun de Microscopie (Joint Microscopy Platform), Platform XPS, LEIST, TOF-SIMS - ENSCL, room 125

14h30 : Coffee break

15h00-17h00 : Visit of platforms - Participants will be split into 2 groups - building C6 : CCM ; building C3: XPS-LEIST-TOF, SIMS

Tuesday 4th April

9h00-9h30 : Presentation of Realcat Platform, École Centrale de Lille, room Bossut, administration building

9h30-11h15 : Visit of Realcat Platform and Themis TEM (Titan) - Participants will be split into 2 groups - Realcat : École Centrale de Lille : (basement) ; Titan: building CISIT

11h30 -13h00 : Lunch

13h00-14h30 : Presentation of Hall Pilot - Building C3, meeting room, ground floor

14h30-16h00 : Visit of Hall Pilot - Participants will be split into 2 groups

17h00-19h00 : Visit of the old town "Vieux Lille" (by foot) ; meeting in the centre of Lille, Office de Tourisme de Lille, place Rihour at 17h00. (Metro station Rihour, line1, it is 30 min by metro from ENSCL)

Wednesday 5th April

9h00-12h30 : Serious games - ENSCL, computer room, first floor

10h30 : Coffee break

12h30-13h30 : Lunch

14h00-19h15 : Visit of « Cristallerie d'Arques »: the largest manufacturer of glassware in the world, specialised in tableware which combines tradition and creativity. Round trip in bus. Meeting at 14h00 in the main entrance of ENSCL - return to the centre of Lille at 7.15 PM.

19h30-22h00 : Dinner, Restaurant "Estaminet Gantois", 224 rue de Paris, Lille

Thursday 6th April

9h00-9h30 : Teaching by « Cross-disciplinary projects »

9h30-10h15 : Teaching by Laboratory Classes in Material Science

10h15 : Coffee break

10h45-11h15: Teaching by pilot-scale Laboratory Classes : Simulation of distillation column using Aspen Plus

11h30-13h00 : Lunch

13h30-15h30 : Coordination Meeting/ New Erasmus project : 4 LABS - ENSCL, room 125

15h30 : Coffee break

16h00-17h30 : Coordination Meeting/ New Erasmus project : 4 LABS

Friday 7th April

9h00-11h30 : Final remarks/ New Erasmus project : 4 LABS - ENSCL, room 125, first floor

10h30 : Coffee break

11h30-13h30 : Lunch

Session 1 : Presentation of technical platforms: CCM (Joint Microscopy Platform), XPS, LEIS, ToF-SIMS

Damien JACOB, Université de Lille-1, Sciences et Technologies

Damien Jacob is Full professor at Lille University. His teaching concerns mechanics and physics for Earth Science as well as specialized courses in TEM and its applications. His research focuses on Microstructural characterization, Transmission Electron Microscopy, Electron Diffraction using convergent beam methods and precession and their applications in mineral science.

Abstract

The Centre Commun de Microscopie (CCM) of the University of Lille, facility of the Fédération Chevreul (CNRS FR 2638), includes most of the electron microscopy facilities of the university. Since 1998, the Center benefits from the label « Instrument National » (INSU/CNRS) in Earth Sciences.

It has a strong national and international reputation in electron diffraction that has built many academic and industrial partnerships. Hence, the CCM provides training service and expertise for laboratories and companies.

The essential characteristic of the CCM is to develop quantitative electron microscopy aspects in the following areas :

- Micro and nano chemical analysis (EDS, EELS)
- Imaging and Electron Diffraction within Transmission Electron Microscopy (with advanced modes)
- Electron tomography with 3D reconstruction
- Advanced uses of Scanning Electron Diffraction (High Resolution Imaging, Electron Back-Scattered Diffraction)

The presentation will highlight the various facilities owned by the center and their applications.

Anne-Sophie MAMEDE, ENSCL

Anne-Sophie MAMEDE is Associate Professor at the National Graduate School of Engineering Chemistry of Lille (ENSCL) where her teachings are focused on Kinetics and Heterogeneous Catalysis. Her research activities are the development of combined surface analysis characterisations (XPS, LEIS, ToF-SIMS) for the study of catalyst active phase and the study of surface reactivity in heterogeneous catalysis by Near Ambient Pressure-XPS (SOLEIL Synchrotron).

Abstract

In heterogeneous catalysis, the optimisation of new catalytic materials goes through i. a better understanding of reaction mechanisms that occur at the outermost atomic layer and ii. a better definition of the active phase and sites. Large improvement of the catalyst nature and composition has recently been achieved with the extensive uses of surface analysis techniques. Here, XPS appears as a suitable tool to characterise the chemical state of the active phase elements. At the UCCS, the *unique combination of electron (XPS) and ion (LEIS, ToF-SIMS) spectroscopies provide a characterisation of the same analysed area without further exposure to air. A combination with a treatment chamber allows following surface modifications induced by reaction mixtures at atmospheric pressure until 1000°C.*

An overview of the three different surface analysis techniques as well as some examples of catalytic applications will be presented.

Session 2 : Presentation of RealCat and CCM (continuation)

Sébastien PAUL, École Centrale de Lille, Villeneuve d'Ascq

Sébastien PAUL is Full Professor at the École Centrale de Lille where he was the head of the Sciences of the Matter department between 2009 and 2016. His research work is carried out in the Unité de Catalyse et Chimie du Solide). He is the head of the VALBIO group (standing for Valorization of the ALkanes and of compounds issued from the BIOMass). Sébastien PAUL is also the coordinator of the REALCAT project (*'Advanced High-Throughput Technologies Platform for Biorefineries Catalysts Design'*; 9.4 M€). He is involved in the development of a large variety of catalytic processes starting from compounds issued from the biomass or hydrocarbons in the frame of academic and industrial collaborations. Finally, he has supervised or co-supervised 16 PhD, 14 post-docs, is co-author of 70 scientific articles, 16 patents, and more than 80 oral communications.

Abstract

REALCAT is a high-throughput platform dedicated to the development of all forms of catalytic reactions (chemical and enzymatic catalysis, heterogeneous, homogeneous and hybrid catalysis). It comprises the preparation, characterization of (i) biologically active compounds and (ii) solids and molecular compounds, as well as catalytic performance studies.

The platform includes :

- high throughput catalysts synthesis equipment's
- tools for rapid characterization,
- systems of parallel reactors,
- high-speed analysis devices
- data management and data treatment tools.

The platform is very versatile, and in addition to catalysts for biorefineries, different projects for homogeneous, heterogeneous and biotechnological catalytic applications in the gas-liquid and gaseous, liquid for a wide range of applications. The REALCAT platform is open for scientific collaboration or subcontracting to external academic and industrial users.



Realcat Platform

Session 3 : Presentation of Hall Pilot

Andrei Khodakov « Catalyst stability issues in energy related reactions »

Vitaly Ordonsky « Selectivity challenges in industrial catalysis »

Abstract

The main objective of the UCCS Catalysis Pilot Hall is to develop more efficient and energy-efficient catalytic reactors, as well as new catalytic formulations that can be validated on realistic feedstocks to accelerate the discovery and technology transfer. Our approach consists in linking the catalyst and its formulation to reactor engineering. The research carried out in this Pilot Hall is particularly focused on two themes:

(I) the production of clean new fuels from renewable and fossil resources;

(ii) the synthesis of platform molecules from renewable and fossil resources;

UCCS has know-how in the field of petroleum cuts, in particular diesel, which allows the elimination of elements responsible for atmospheric pollution for the production of clean fuels. Other routes of direct production of clean fuels are also explored by Fischer-Tropsch synthesis from the conversion of second-generation biomass (BTL technology, heavy alcohol synthesis, etc.). Finally, we are working on the production of large biosourced chemical intermediates and platform molecules (bio-refineries) in replacement of those traditionally derived from petroleum.



Hall Pilote Catalyse

Session 4 : Presentation of serious Games

Gaëlle Guigon, Institut Mines Télécom - IMT Lille Douai

Gaëlle Guigon holds a Master's degree in Instructional Design from the University of Lille. Since graduating, she has worked within the educational innovation team at IMT Lille Douai in France. She designs Technologies Enhanced Learning (TEL) enabling students to acquire many skills. Gaëlle creates and develops serious games (video games and escape games) for: fluid mechanics, air quality, combinatorial optimisation. This type of TEL allows to obtain personalised paths (thanks to different tools like the "Scenari" editorial chain). Gaëlle also creates websites, assists the management of MOOC and creates graphic design works for the needs of the team and the school.

Mathieu Vermeulen, Institut Mines Télécom - IMT Lille Douai

Mathieu Vermeulen received a Master of Science in Mathematics and a Master in Instructional Design at University of Lille. For 14 years, he has worked at IMT Lille Douai as instructional designer and team manager, developing educational innovations and Technologies Enhanced Learning (TEL), like pedagogical Agile Approaches, Serious Games, MOOC. He develops innovations for many scientific themes (fluid mechanics, statistic, computer science) Since 2015, he is PhD student in the MOCAH team at UPMC, Sorbonne Universités of Paris. His main researches focus on the meta-design of serious games involving teachers at the stages of design and use. He is developing a formal model of serious games, methods and visualizations for student traces analysis.

Abstract

The "serious game" term has several definitions depending on the context and authors. In order to clarify this ambiguous concept, a serious game can be defined as "a virtual environment and a gaming experience in which the teaching contents can be naturally embedded with some contextual relevance in terms of game-playing". Many achievements have shown the interest of serious games in the transfer of skills and knowledge by developing the attractiveness and promoting the motivation to learners. However, teachers in higher education have difficulties to create and to adapt learning games to their pedagogy. The question is how to allow teachers to design and to adopt serious games. To tackle the challenge of teachers' adoption and design, we focused our work on their appropriation of these latter aspects through several works involving the meta-design approach. With this approach, we aim to fully involve teachers in the learning games design, either at the design stage (i.e. before the release of learning game, thus during production) and at the use stage (i.e. after the end of the production, thus when the design team is not involved any more).

After a short presentation of this approach, we develop two aspects through two tools: one at the design stage, with a model (named DISC) meant to design serious games by teachers of higher education and one at the use stage, with a tool to visualize the learners' traces of serious game use. Finally, a practical application will be done with a serious game designed with DISC as an activity of a fluid mechanic course.

Session 5: Learning by doing

Abstracts

Cross-disciplinary project

During the 5th and last year of curriculum, each professor involved in the Material Science program can submit to a group of 2 or 3 students a project that reflects a specific application field (surface treatment, metallurgy, cristallochemistry, catalysis materials, chemical engineering materials, software assisted selection of materials...). The project takes place inside ENSCL laboratories and can be connected with an industrial partner. It includes a literature survey, a proposal and a realisation of an experimental procedure suitable for solving the problem and then a discussion of the obtained results. A condensed report associated with an oral presentation in front of the students and the teachers are then given. In addition, economical aspect as well security consideration must accompany the technical part. Some examples of transversal projects will be presented.

Materials

During the 4th year of study, part of the ENSCL students follows practical trainings in metallurgy. The particular approach used hereby is to put them with problematics they do not have seen within their lectures. Hence, by taking into account the basic knowledge they own, they can understand more complicated phenomena.

The implementation of fundamental knowledge acquired in metallurgy is operated through a metallurgical report. Here, a group a students will present the approach they have followed as well as their results.

Aspen Plus

Aspen Plus is ASPEN is a process simulation software widely used in industry today. Students use this software to analyse results from pilot plants. An example of chemical engineering laboratory classes is presented by Erasmus student.

Campus map



Visits

Tuesday :

Visit of the old town « Vieux Lille » (by foot)



« Immerse yourself in Lille's most charming district, where architecture, shops, museums will seduce you !

Stroll around the streets and the squares to discover the heritage, the history and "art of living" of the town through its main sites and monuments : the Palais Rihour, the Main Square, the Opera House, the Notre-Dame de la Treille cathedral. »

Wednesday :

Visit of « Cristallerie d'Arques » : the largest manufacturer of glassware in the world.

« Prepare to be amazed as alchemy meets the power of fire to create delicate, translucent glass. Formed at a temperature of 1500°C, drops of molten glass are transformed before your very eyes into finished pieces, packaged and ready for sale. »

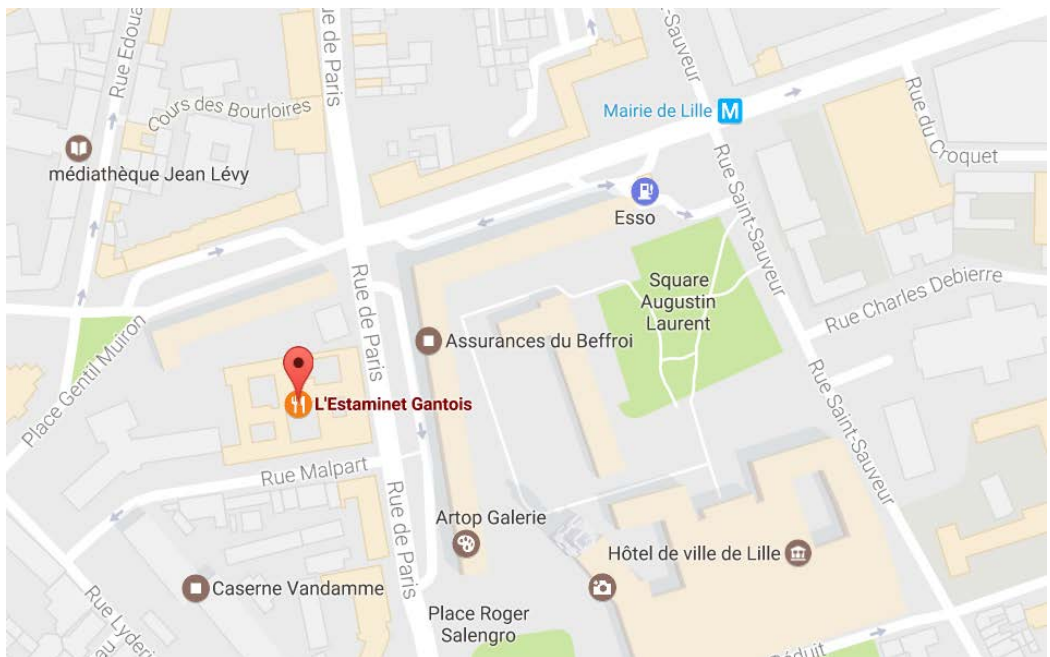
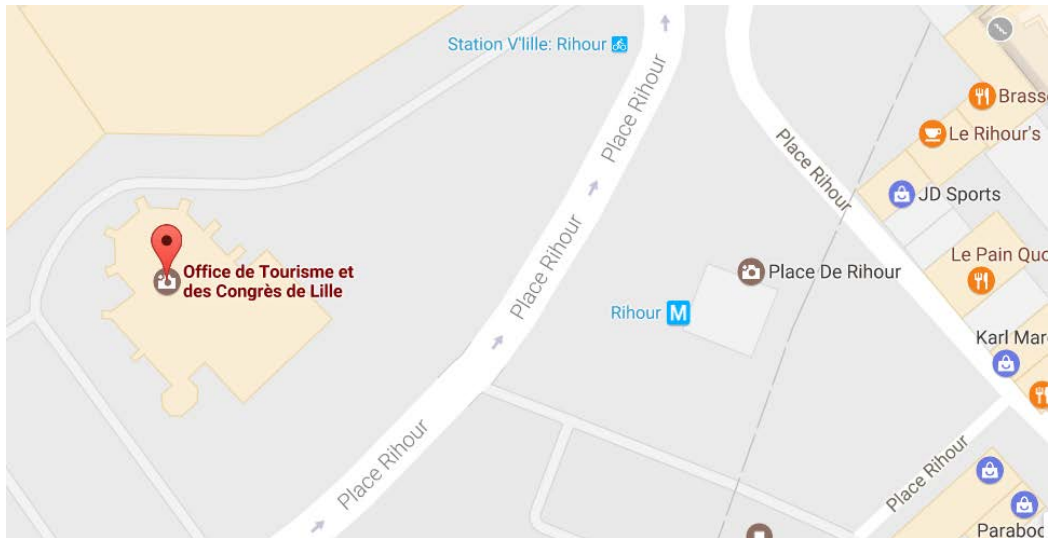


Wednesday :

Dinner, Restaurant « Estaminet Gantois »



Meeting points



Participants

Cracow University of Technology (PK)



The National Graduate School of Engineering Chemistry of Lille (ENSCL)



Munster University of Applied Sciences (FH-MS)



The Polytechnic Institute of Bragança (IPB)



The National Graduate School of Engineering Chemistry of Lille (ENSCL)

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