

École doctorale
Sciences chimiques

université
de **BORDEAUX**

23TH DOCTORAL SCHOOL OF CHEMICAL SCIENCES DAY

JUNE, 10TH 2021

BIOMIMETISM AND BIOINSPIRATION: SOURCES OF KNOWLEDGE TO CREATE NEW MATERIALS

Pr Clément Sanchez
Collège de France - Paris

PLENARY CONFERENCE

Guest professor

ORAL COMMUNICATIONS

3rd and 2nd year PhD students

zoom 

POSTER SESSION

2nd year PhD students

Space between building A9 and A10
Talence campus

23TH DOCTORAL SCHOOL OF
CHEMICAL SCIENCES DAY

Schedule

9:30 to 11 a.m.

Poster session

1 to 2 p.m.

Oral presentations
by 3rd year PhD students

2 to 3 p.m.

Plenary conference

3:15 to 6:30 p.m.

Oral presentations
by 2nd year PhD students

6:45 p.m.

Awards

1 Aurélie Achille

Monitoring tantalum nitride thin films structure by reactive HiPIMS magnetron sputtering :
from microstructure to properties

2 Lauriane Faure

Sintering of Lead-Free dielectric and piezoelectric ceramics by Cool-SPS

3 Arthur Klufts-Edel

Low Molecular Weight Oleogel formation via unique Keto-enol type nucleolipid
supramolecular assembly

4 Marion Boyet

Photodecaging of boronic and borinic acids under UV light

5 Emeline Vidal

Investigation high pressure methanogenesis in a CO₂ recycling context

6 Alejandra Gadea

Directed evolution of glucose oxidase using droplet-based microfluidics

7 David Van Assche

Droplet production by controlled jet breakup using modulated electric fields

8 Péroline Helbling

From the design of cyclic carbonates to the synthesis of
polyhydroxyurethane materials: alternatives to isocyanate-based polyurethanes

9 Sara Amar

Zeolite Templated Carbon : a Promising Material for Supercapacitor

10 Clara Becote

Combining an acoustic levitator with a proton-transfer-reaction mass spectrometer and a
Raman microspectrometer for studying single droplet reactivity of atmospheric interest

11 Thomas Gigou

Source atomique de carbone à partir de complexes C(O)

12 Rongyu Sun

Asymmetric synthesis of allenes from simple alkynes using novel diselenide reagents

13 Hugo Marchi Luciano

Novel luminescent and liquid crystalline materials of threefold symmetry

14 Morgan Barbier

Hydroarylation reactions involving alkyne activation catalyzed by Brønsted acids

15 Manon Basset

Frontal filtration to drain lactic goat curd

16 Luyan Yang

MicroRNA-21 Detection by DNA Nanopore Using Electrochemical Sensing Method

17 Axel Le Doze

Élaboration par CVD et caractérisation d'un revêtement base silicium pour sous-couche de barrière environnementale

18 Damien Magis

Amino(aryl)carbenes synthesis and reactivity study

19 Fabrícia Nunes Da Silva

Design, synthesis and study of novel luminescent and liquid crystalline aza-heterocycles

20 Margaux Penicaud

Synthesis and characterization of Spin Crossover materials based on a heteroscorpionate ligand

21 François Rouzé L'Alzit

Selective laser sintering of Copper-doped Hydroxyapatite: experimental and numerical parametric analysis

22 Ludmilla Sturm

Perkin strategy for molecular engineering

23 Dandan Lou

Molecule-based magnets with high ordering temperature and electronic conductivity

24 Quentin Bouteille

Modulable hydrogen bonding organocatalysts

25 Aline Delamare

Incorporation of hexafluoroleucine analogue in oligoureia peptidomimetic architectures

26 Bilal Chahhou

Synthèse et propriétés thermo-chimiques des composites SiC/MAX

27 Vincent Laffilé

Understanding Native Electrospray of Artificial and Natural Polymers

28 Bérangère Dessane

Nanoemulgel for drug delivery based on first supramolecular oleogelator

29 Nadia Mahmoudi

Development of a matrix based on elastin-like polypeptides (ELPs) to promote neurovascular network for bone Tissue Engineering

30 Adrian Hereu

Métasurfaces nanostructurées pour le contrôle de l'apparence visuelle

31 Arthur Derrien

Mise en œuvre de silicates de terres rares par dépôt chimique en phase vapeur (CVD)

3rd year PhD students

1:00 p.m

Lara Jamal El Dine (EPOC)

Étude de la dégradation d'un fongicide en milieu aqueux sous rayonnement solaire simulé
Environmental and Analytical Chemistry

1:20 p.m

Jessie Jacob (LCPO)

Increasing the stability of emulsions and suspensions - Application to recycled paints
Polymer Science

1:40 p.m

Alejandra Gadea (CRPP)

Directed Evolution of Glucose Oxidase
using Microfluidics
*Environmental and Analytical Chemistry,
Chemical Engineering*



Invited speaker

CLÉMENT SANCHEZ

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For the past five hundred million years nature has produced materials with remarkable properties and features such as the smart functional surfaces found in some leaves and flowers, the beautifully carved structures found in radiolaria or diatoms, the extraordinary mechanical and self-healing properties found in many composites.

Another of nature's remarkable features is its ability to combine at the nanoscale (bio) organic and inorganic components allowing the construction of smart natural materials that found a compromise between different properties or functions (mechanics, density, permeability, colour superhydrophobia, porosity, etc.). Such a high level of integration associates several aspects: miniaturisation whose object is to accommodate a maximum of elementary functions in a small volume, hybridisation between inorganic and organic components optimizing complementary possibilities, functions and hierarchy. Current examples of natural organic-inorganic hybrids are crustacean carapaces or mollusc shells, bone or teeth tissues in vertebrates, byssus of mussels etc... As far as man-made materials are concerned, the possibility to combine properties of organic and inorganic components for materials design and processing is a very old challenge that likely started since ages (Egyptian inks, green bodies of china ceramics, prehistoric frescos, Maya Blue pigments etc.).

However, to day bottom-up strategies allow to design the so-called hybrid organic-inorganic materials where organic and inorganic components are intimately mixed. It is obvious that properties of these materials are not only the sum of the individual contributions of both phases, but the role of the inner interfaces could be predominant. Hybrid materials based strategies are today generating smart membranes, new catalysts and sensors, new generation of photovoltaic and fuel cells, smart microelectronic, micro-optical and photonic components and systems, or intelligent therapeutic vectors that combine targeting, imaging, therapy and controlled release properties.

This tutorial presents a few striking examples of bioinspired functional materials built via bottom-up strategies. In particular naive analogies between, engineering and processing made by nature to construct performant materials and the today strategies used by materials chemists and engineers to produce modern materials through a kind of controlled design will be emphasized.

2nd year PhD students

Jury 1

Véronique Jubera, Serge Ravaine, Christophe Schatz, Thierry Toupance

3:15 Marie Devreux

Synthesis and study of polymersomes dual-labelled for MRI and optical imaging: towards image-guided drug delivery

3:30 Fatma Ercicek

Cocrystallization in compressed CO₂

3:45 Margaux Haurat

Foaming of polymer blends designed for nano foams in supercritical CO₂

4:00 Jiaming Huang

Conductance Switchable Foldamers: An Alternative Towards Molecular Electronics

4:15 Dharshana Nalatamby

In-situ microviscosity measurements in microfluidic chip using fluorescent molecular rotors

4:30 Chloé Pascouau

2,4-dihydroxybutyric acid as a biomonomer precursor for new biocompatible and biodegradable polymers

4:45 Erwan Peigney

Study of boehmite nanoparticles prepared by the continuous supercritical hydrothermal synthesis

5:00 Thibault Pelloquin

Passive air sampling for assessing exposure of bees to pesticides inside beehives

5:15 Coralie Robert

Study of molecular markers of vine wood dieback by solid state NMR

5:30 Valentin Saibi

New lithium-rich layered oxides as positive electrode material for lithium-ion battery application

5:45 Romain Wernert

Anionic substitution to modulate the structure and electrochemical properties of KVOPO₄ and KVPO₄F positive electrode materials for potassium ion batteries

6:00 Yujie Zhang

Disordered micropatterning for Osteogenic Differentiation of Mesenchymal Stem Cells

6:15 Kevin Moreno

Optical and chiroptical properties of chiral fluorescent helices

6:45 Awards

2nd year PhD students

Jury 2

Sébastien Bonhommeau, Corine Mathoniere, Victor Maurizot, Yaocihuatl Medina-gonzalez

3:15 Frederic Aribot

[5]helicene-bridged pairs of aromatics

3:30 Megi Bejko

Hybrid nanoparticles for biomedical applications

3:45 Alexandre Brillon

Matériaux composites Al/B₄C pour les emballages de combustibles nucléaires

4:00 Mathias Brouillard

Synthesis and formulation of Acid-based nucleolipids for neurodegenerative diseases.

4:15 Noémie Coudon

Stabilization of water-in-water emulsions by fatty acids: a model of hybrid protocells

4:30 Gwenaëlle Courbaron

Development of cobalt free & high voltage positive electrode materials for all solid state batteries application

4:45 Mikko Hongisto

Research into Yb-doped glasses and transparent glass-ceramics.

5:00 Anouk Martin

Microfluidic-assisted self-assembly of PEG-b-PTMC vesicles:
Size control and drug loading

5:15 Carmelo Naim

Impact of Van der Waals interactions on Structural and Nonlinear Optical Properties of Azobenzene switches

5:30 Tatjana Šafarik

Engineered Complex Electrode Architectures for Biosensing Applications

5:45 Marine Steffann

Accepteur de fluorures à base de silicium (SiFA) sur supports solides : un nouvel outil polyvalent pour la fluoration au Fluor-18 de peptides et de structures biologiques

6:00 Kostiantyn Tieriekhov

Unconventional enantioselective analysis and separation of chiral molecules

6:45 Awards