PSL Chimie

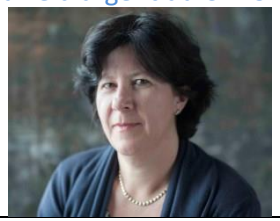
Bio-inorganic Chemistry at PSL

A series of seminar in bio-inorganic chemistry,
presented by M. Fontecave (CdF), G. Gasser (Chimie Paris-Tech), Clotilde Policar (ENS) and Raphaël Rodriguez (Institut Curie).

PSL - BIC Program 2019

Room E012, salle des éléments, département de chimie de l'ENS, 24 rue Lhomond, 16h30 / 4pm30

This seminar is founded by PSL (ANR 10-IDEX-0001-02)

Who, When	University	**Title**	Short abstract
2019, February Friday 8th 4pm30 Eva Toth Médaille d'argent du CNRS 2018 	Centre de Biophysique Moléculaire, Orléans, UPR 4301 eva.jakabtoth@cnrs-orleans.fr	**Molecular imaging agents based on lanthanide complexes**	MRI is well adapted to the design of responsive probes, capable of giving a specific response as a function of physico-chemical tissue parameters or biomarkers. The MRI efficacy of Gd^{3+}-based or Paramagnetic Chemical Exchange Saturation Transfer probes can be selectively influenced, based on coordination chemistry concepts, by the particular biomarker that we wish to detect. Potential smart agents to detect cations, neurotransmitters or to monitor enzyme activity will be discussed.
2019, February Friday 15th 4pm30 Lionel Chéruzel 	San Jose State University, Department of Chemistry, DH 286, One Washington Square, San Jose, CA, USA 95192-0101 *Invited professor, Paris-Sud*	**Hybrid P450 Enzymes Featuring Ru(II)-diimine Complexes**	Our laboratory develops hybrid P450 enzymes containing a Ru(II)-diimine photosensitizer covalently attached to P450 heme domains to harness their synthetic potential upon visible light excitation. Optimization of the biocatalyst photocatalytic activity has included a combination of rational and directed evolution approaches while taking advantages of the Ru(II)-diimine complexes. Merging of photoredox catalysis with the hybrid enzyme has enabled selective light-driven chemoenzymatic trifluoromethylation oxyfunctionalization of a wide range of substituted arenes.
2019, March Friday 22nd, 4pm30 Martin Stillman 	Department of Chemistry The University of Western Ontario Canada martin.stillman@uwo.ca	**Pushing native ESI-MS to the limit : Believing in metallation binding constants and rate constants for the metallation of metallothioneins**	I will describe advances in quantitative analysis of the metallation properties of metallothioneins from equilibrium, time-dependent and temperature-dependent ESI-MS studies. The 20 cysteines bind 7 or 8 Zn(II)/Cd(II), and 12 or 13 Cu(I), and various stoichiometries of Hg(II) and As(III). I will extend these studies to binding pathways we have described as "non-traditional" for metallothioneins, pathways involving reactions with cisplatin and dirhodiumtetraacetate

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2019, **Monday April 8th** Thibaud Rossel 	Gymnase français de Bienne Rue du débarcadère Switzerland thibaud.rossel@emsp.gfbienne.ch	**Indicator displacement assays: A versatile tool for education and research**	State of the art research is usually practised only in universities and companies, and almost never in high schools. To bring research in high schools, we created a specific research protocol accessible for the students using bio-inorganic chemistry, indicator displacement assays, and combinatorial chemistry. On top of showing that relevant research is doable in high schools, extremely promising results are obtained in the field of bio-sensing.
2019, April **WEDNESDAY 10th afternoon** **(timing to be précised later)** David Giedroc tutorial and seminar 	Department of Chemistry, Indiana University, Bloomington, IN 47405-7102, USA; giedroc@indiana.edu **ATTENTION JOUR et FORMAT INHABITUELS-UNUSUAL WEEK-DAY and UNUSUAL FORMAT MERCREDI 10 AVRIL**	Tutorial : Leveraging biophysical and bioinorganic chemistry to investigate bacterial transition metal homeostasis Title for the seminar: From molecules to metabolism: Elucidating the bacterial adaptive response to host-mediated transition metal starvation	Abstract of the seminar :First-row late *d*-block metals from Mn to Zn play distinct roles in cellular metabolism. In bacterial pathogens, metalloregulation of transcription underscores physiological adaptation to host-mediated transition metal starvation and toxicity, required to maintain metal homeostasis and cellular viability. I will describe our efforts to understand this process on multiple levels, from the biophysical chemistry of metal ion sensing to the chemical biology of metabolic adaptation.
2019, May (mid-may) 4pm30 – *schedule not yet available* Liz Nolan 	Department of Chemistry, Massachusetts Institute of technology (MIT) lnolan@mit.edu	**Metals and Immunity: Bioinorganic Explorations of Calprotectin**	Transition metals ions are essential nutrients for all organisms, and limiting the availability of these nutrients to starve invading microbial pathogens is one strategy of the mammalian innate immune system. Calprotectin (CP) is a versatile metal-sequestering protein that plays a central role in “nutritional immunity.” The biological coordination chemistry and function of CP in metal-withholding at the host-microbe interface will be discussed.

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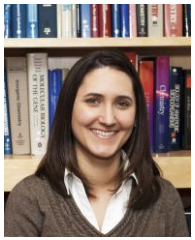
2019, July, **THURSDAY 4th,** 4pm30 Daniella Buccella 	Department of Chemistry, New York University dbuccella@nyu.edu **ATTENTION JOUR INHABITUEL-UNUSUAL WEEK-DAY JEUDI 4 JUILLET**	**Fluorescent tools and strategies for the study of cellular magnesium**	Disrupted homeostasis of magnesium has been associated with pathologies including age-related diseases, neurodegeneration, and cancer. However, detailed understanding of the mechanisms by which intracellular Mg^{2+} concentrations are regulated is still lacking, hampered by the paucity of tools for the detection of this ion in the complex environment of the cell. This talk will cover our most recent efforts in the design of molecular and hybrid fluorescent probes for the detection of Mg^{2+} with improved selectivity and subcellular resolution, and their application in the study of cellular cation homeostasis. New insights into fundamental aspects of photoinduced electron transfer and fluorogenic reactions will be discussed in the context of sensor design.
2019, July, 5th, 4pm30 Raphaël Tripier 	Université de Bretagne Occidentale (UBO) Raphel.Tripier@univ-brest.fr	**Highly performant azamacrocyclic chelates tailored for diagnosis and therapy: Full control of the ligand design makes the difference!**	The importance of azamacrocycles in imaging (MRI, PET, optical probes) and therapy (radiotherapy) is now well establish. However, the challenge to find good chelators able to be used in both diagnostic and therapeutic applications persists since there is still no "ideal" ligand able to coordinate different metallic cations of interest and to allow, only by changing the cationic core, imaging and therapeutic purpose. Our new specially designed azaligands able to take on this challenge will be presented.
2019, September *schedule not yet available* Ines Batinic-Haberle 	Department of Radiation Oncology-Cancer Biology Duke University Medical Center, Durham, NC 27710, USA ibatinic@duke.edu	**Mn porphyrins, commonly known as SOD mimics, act as radioprotectors of normal tissue and anticancer agents via thiol signaling**	Mn porphyrin (MnP), MnTnBuOE-2-PyP^{5+} (BMX-001) is presently in 4 clinical trials with cancer patients on the radioprotection of normal brain, salivary glands, mouth mucosa and low pelvic region. The 5th clinical trial is on non-cancerous applications of another analog MnTE-2-PyP^{5+} (AEOL10113, BMX-010) – atopical dermatitis and itch. While initially developed as SOD mimics, over 2 decades of research taught us that MnPs are able to interact with numerous biological targets acting as antioxidants and pro-oxidants while producing favorable therapeutic effects. Combined efforts of numerous groups that worked on basic and translational aspects of MnPs demonstrated that MnPs, in the presence of glutathione and H_2O_2, oxidize protein cysteines thereby effecting signaling processes. The most obvious impact of MnP was on the oxidation/S-glutathionylation of NF-kB. Additionally the impact of MnP on Nrf2, MAPK, phosphatase and endogeous antioxidative defenses has been reported also.