Résultats de l'appel à projets ECOS Sud – Chili 2021 : Projets sélectionnés

Code	Intitulé du projet	Abstract	Responsable français	Responsable chilien
C21B01 CUNY	EMMA: Exploration du rôle des Microorganismes dans les transformations du Mercure au sein des écosystèmes Aquatiques	Mercury has three forms: elemental (liquid mercury), inorganic mercury and organic mercury (methylmercury). The neurotoxin methylmercury is highly toxic to living organisms and easily incorporated, bioaccumulated and biomagnified throughout aquatic food webs. Mercury, originates from natural and anthropogenic sources. Under certain atmospheric conditions, it can travel long distances or be stored in ice (continental or polar glaciers). The deposition of this inorganic mercury or its release due to glacier melting makes this metal available in aquatic ecosystems. In these ecosystems, mercury is transformed (methylation) into methylmercury by both biotic (microorganisms) and abiotic (UV rays for example) processes. Among the microorganisms capable of methylating mercury, it has long been accepted that strict anaerobic bacteria and archaea particularly those capable of reducing sulfates or iron, would be the only ones driving such a process. However, recent works show, through molecular data, that bacteria thriving aerobically (in the presence of oxygen), mainly the genus *Nitrospina*, also can synthsize methylmercury. In South America, Chile is a country with a long mining history, having played a major role in global emissions of mercury into the atmosphere or into aquatic ecosystems. If the mines are generally located in the North and the Center of the country, the transport and the storage of this metal led to a possible accumulation in the Andean glaciers as well as the Antarctic ice. As a result of global warming, this mercury might be released during the austral summer from glaciers to rivers and ultimately to the sea. Little is known in this region about the form in which mercury is delivered, its reactivity and its quantity. Also, the proportion of methylmercury produced by microorganisms in rivers, in the oceans or/and when the ice melts is still elusive. The combination of molecular, isotopic and cultivation tools in a gradient of aquatic ecosystems gradually affected by atmospheric deposition of will allow a better understanding of the mercury cycle. In order not only to generate knowledge but also to transmit it and make it last, this exchange and teaching/training project will make it possible to describe for the first time the microbial dynamics of mercury from the Atacama desert to Antarctica. Finally, the priority will be to train new generation of researchers for interdisciplinarity, international collaboration and exchanges of experience.	**CUNY Philippe** Co-Directeur HEIMBÜRGER-BOAVIDA Lars-Eric AIX-MARSEILLE UNIVERSITÉ Institut Méditerranéen d'Océanographie (M.I.O) UMR 7294 – Campus de Luminy - 163 avenue de Luminy - 13288 Marseille Cedex 9 philippe.cuny@univ-amu.fr	**LAVERGNE Céline** Universidad Playa Ancha (UPLA), Valparaíso HUB AMBIENTAL UPLA,Subida Leopoldo Carvallo 270, Valparaíso, Chili

C21B02 SAEZ VASQUEZ	Analysis of lncRNAs in plant defense: An in silico and experimental approach to identify lncRNAs regulated by WRKY7/11/17 and explore their biological functions in the immune response of Arabidopsis thaliana upon Pseudomonas syringae infection		**SAEZ-VASQUEZ Julio** Laboratoire Génome et Développement des Plantes UMR 5096 CNRS/UPVD, 58 Av. Paul Alduy 66860 PERPIGNAN saez@univ-perp.fr	**BLANCO-HERRERA Francisca** Centro de Biotecnologia Vegetal, Laboratorio de fitopatología Facultad de Ciencias de la vida, Universidad Andres Bello, República 330, primer piso, Santiago mblanco@unab.cl
C21B03 PELOSI	Protective potential of zinc against copper toxicity to earthworms in vineyard and orchard soils contaminated with copper-based pesticides	Copper-based pesticides have been used around the world for more than 200 years to control bacterial and fungal diseases in a variety of crops. However, the use of these pesticides can damage earthworm communities in vineyards and orchards, leading to long-term deterioration of the ecological attributes and agricultural value of soils. In France and Chile, several authors reported high copper contents in vineyard and orchard soils due to the application of copper-based pesticides. Therefore, it is important to seek practical solutions that alleviate copper toxicity in contaminated agricultural soils, allowing them to remain suitable for agricultural use and the provision of additional ecosystem services. Evidence suggests that zinc may alleviative copper ecotoxicity. However, these studies were conducted under hydroponic conditions or with uncontaminated, metal-enriched soils. Typically, these experiments overestimate the toxicity of metals in soil and do not represent actual contaminated soils in the field, such as those contaminated by copper-based pesticides. We are aware of only two studies, both conducted by our group, on the protective effects of zinc against metal toxicity to plants and soil microorganisms in field-contaminated soils, but none on earthworms, despite the ecological importance and universal acceptance of earthworms as an indicator of soil quality. In this project, we will test whether zinc has a protective effect on the toxicity of other metals to earthworms in field-contaminated soils. If it does, our study will provide evidence for practical and affordable solutions to the problem of metal contamination in agricultural soils, for example, by applying zinc fertilizers to contaminated soils to decrease the toxicity of other metals (with the added advantage that zinc is a micronutrient). Since the experiments will use metal-contaminated soils collected from fields, they will provide realistic results and benefit a number of communities.	**PELOSI Céline** UMR 1114 EMMAH INRAE-Avignon Université, Bâtiment Sol, Domaine Saint Paul, Site Agroparc, 228 route de l'Aérodrome, 84 914 AVIGNON Cedex 9 celine.pelosi@inrae.fr	**NEAMAN Alexander** Instituto de Ingeniería Agraria y Suelos, Universidad Austral de Chile, Valdivia, Chile alexander.neaman@gmail.com

C21B04 PELLOUX	Mucilage synthesis as a read-out to unravel the effects of heat stress on plant cell wall polymers		**PELLOUX Jérôme** Université de Picardie Jules Verne, Amiens. UMR INRAE 1158 BioEcoAgro Biologie des ¨Plantes et Innovation, UFR des Sciences, 33 rue st Leu, 80039 Amiens, France. jerome.pelloux@u-picardie.fr	**SAEZ RIVERA Susana** Universidad Andrés Bello (UNAB), Santiago, Mucilab, Centro de Biotecnología Vegetal (CBV), República 330, CBV, Mucilab piso 3, Santiago, Chile. susana.saez@unab.cl
C21B05 MAIURI	« Metabolites regulate autophagy in POMC neurons exposed to palmitic acid »	Obesity and its complications cause at least 2.8 million of deaths every year and represent a large portion of the medical expenses worldwide. Safe and efficacious drug therapies are needed, since currently available drugs for long-term weight management are limited in number and efficacy. Consumption of high fat diets, rich in the saturated fatty acid palmitic (PA) is a key factor in the increase in obesity rates. Autophagy is a catabolic process required for the maintenance of cellular and tissue homeostasis. Among the different types of autophagy macroautophagy (MaA) and chaperone-mediated autophagy (CMA) play an important role in metabolism regulation. Autophagy imbalance causes different pathological conditions, and obesity is one of them. In the hypothalamus, a brain area with a key role in the regulation of body weight, inhibition of autophagy in proopiomelanocortin (POMC) neurons increase food intake and reduces energy expenditure, promoting obesity. Despite this, the mechanism by which this is occurring is still unclear. Interestingly, previous work shows that dietinduced obesity causes selective metabolic reprogramming in different types of cells and tissues, changing the levels of metabolites that modify the activity of stress sensors, such as AMPK and mTOR, which are also master regulators of autophagy. However, to date, it is unknown the impact of palmitic acid on cell metabolites, and therefore on the energy rates of the cell, which could ultimately impact autophagy in hypothalamic POMC neurons. Our hypothesis is that PA differentially affects MaA and CMA in hypothalamic POMC neuronal cells, depending on the level of specific metabolites and the activity of their specific metabolic pathways. The goal of this project is to create a collaborative research network between French and Chilean investigators focused on understanding the types of autophagy and metabolites altered in the hypothalamus, specifically in POMC neurons exposed to palmitic acid.	**MAIURI Maria Chiara** Centre de Recherche des Cordeliers (CRC), UMRS1138 , « Metabolisme, Cancer et Immunité », 15 rue de l'école de médecine, 75006 Paris chiara.maiuri@crc.jussieu.fr	**CRIOLLO Alfredo** Universidad de Chile, Facultad de Odontología, Instituto de Investigación en Ciencias Odontológicas, Laboratorio de Biología Celular y Molecular, 943 Olivos. Independencia, Santiago, CHILE alcriollo@u.uchile.cl

C21E01 NGUYEN VAN NHIEN	Hydrogels based on the biowaste chitin nanofibers to save water in chilean agriculture (NanoBioGel)	Le changement climatique a modifié la température et les précipitations et devrait avoir un impact énorme sur la réduction de la productivité agricole mondiale. Une méga sécheresse a touché le centre du Chili depuis 2010, avec des déficits pluviométriques moyens de 20 à 40%. L'agriculture, très consommatrice en eau, est responsable de la consommation de plus de 85% des ressources en eau disponibles. Par conséquent, il est crucial d'utiliser l'eau plus efficacement. La rétention d'eau dans la zone racinaire des plantes figure parmi les méthodes les plus efficaces, notamment par l'utilisation d'hydrogels avec un immense potentiel en agriculture. L'objectif de cette étude est de concevoir des hydrogels biorenouvelables obtenus à partir de co-produits tels que la chitine, la cellulose ou la soie afin d'améliorer l'efficacité d'utilisation d'eau au niveau des racines de vigne ou encore des avocatiers. L'appel à projet ECOS-SUD donnera l'occasion de renforcer et de consolider la collaboration actuelle entre le LG2A (France) et le laboratoire « Postharvest Physiology and Food Biochemistry » (Chili). L'équipe française développera les nouveaux nanohydrogels et l'équipe chilienne développera un hydrogel à base d'alginate bactérien pour étudier l'effet de ces deux familles d'hydrogels sur les racines des plantes. En outre, nous intégreront dans ce consortium de nouveaux participants (Biophysical & Environmental Plant Physiology Group and Microbial Polymer Biotechnology Lab from Chile) afin de proposer des approches multidisciplinaires pour aboutir à des solutions durables à la rétention d'eau dans le sol. La formation de jeunes chercheurs comprend deux étudiants de troisième cycle du Chili (doctorat en sciences agroalimentaires, PUCV) et un doctorant de France.	**NGUYEN VAN NHIEN Albert** Université de Picardie Jules Verne – UPJV (Amiens), Laboratoire de glycochimie, des antimicrobiens et des agroressources CNRS UMR 7378, 33 rue saint leu, 80000 Amiens albert.nguyen-van-nhien@u-picardie.fr	**FUENTEALBA Claudia** Pontificia Universidad Catolica de Valparaiso, Escuela de Alimentos, Waddington 716, Playa Ancha, Valparaiso claudia.fuentealba@pucv.cl
C21E02 GARNIER	Continuous-time nonlinear system identification using Deep Learning	System identification is the field concerned with the task of building models of dynamic systems from input-output data. The rise of big data, advanced algorithms in machine learning and optimization, and modern computational hardware have opened the door to novel methods that allow to model complex systems. In this proposal we aimed at the estimation of nonlinear models using deep learning techniques. We consider firstly physically informed neural networks to estimate continuous-time state-space models, using regularization and data augmentation techniques. Secondly, we consider data-driven modeling of systems under variable conditions for predictive maintenance purposes, where the degradation of a given asset or processes is difficult to model exactly, but large operational data sets are available. In the third specific goal, we consider the parameter estimation problem for Wiener systems where linear dynamics are followed by a static nonlinearity, using maximum likelihood estimation and the expectation-maximization algorithm. The algorithms developed during the project will be tested on real case systems, to assess their accuracy and their performance in practice.	**GARNIER Hugues** Polytech Nancy – CRAN – CNRS UMR 7039, Université de Lorraine, 2 rue Jean Lamour - 54500 Vandoeuvre-les-Nancy hugues.garnier@univ-lorraine.fr	**YUZ Juan** Department of Electronic Engineering and Advanced Center for Electrical and Electronic Engineering, Universidad Técnica Federico Santa María, CHILE juan.yuz@usm.cl

C21E03 SERP	Noble metal single-site and nanoparticle hydrogenation catalysts on titania nanotubes	Single-site catalysis (isolated metal atom or immobilized complex) has become in recent years a major research axis in heterogeneous catalysis. In these systems, the absence of ensemble effect and the existence of strong electronic/geometric (confinement) effects linked to the support induce a reactivity very different from that of the metallic particles. Single-site catalysts and confinement effects have probably been around for a long time in many supported catalysts (including commercial ones) in association with metal nanoparticles, and have certainly played an important role in many catalytic processes, but they have rarely been recognized as levers to guide catalysis. In this context, this project aims to develop a new generation of supported catalysts, combining in a controlled manner isolated/complex-atoms and metal particles confined in TiO2 nanotubes, in order to achieve cooperative hydrogenation catalysis for reactions of industrial interest. In this cooperative catalysis, isolated sites and particles participate in the facilitation of reactions, which would be less favorable on a single type of site. Preliminary results obtained by partners of project strongly support this innovative approach.	**SERP Philippe** LCC, UPR8241 CNRS, composante ENSIACET, 4 allée Emile Monso 31030, Toulouse philippe.serp@ensiacet.fr	**TORRES MUÑOZ Cecilia Carolina** Departamento de Ciencias Químicas, Facultad de Ciencias Exactas,Universidad Andrés Bello, Autopita Concepción-Talcahuano 7100, Talcahuano, Chile cecilia.torres@unab.cl

C21E04 PETITE	ACEDic : Algebraic, combinatorial and ergodic aspects of « S-adic » systems	Recent advances in the application of the study of Cantor minimal systems and of symbolic dynamics give connections to many areas of mathematics and lead to unexpected developpements in number theory, group theory and theoretical computer science. This project concerns the study of these dynamical systems through different aspects : ergodic, combinatorial and algebraic. Their links with the representations of the system in term of Bratteli-Vershik systems or by a directed sequence of morphisms called S-adic, has to be explored. Among the main fundamental questions in the area we propose to tackle those concerning: the characterization of the mixing properties of the S-adic subshifts, the computability of their dynamical invariants and the relation of their complexity with topological orbit equivalence class. In the multidimensional context, we will study the factors, joinings and normalizer groups of multidimensional substitutions subshifts. This project aims to bring together leading researchers from Chile and France, working in the distinct subareas, to jointly tackle open problems concerning the afore mentioned topics. Extending already established fruitful collaborations between Chile and France and founding new ones we are looking forward to a productive scientifc cooperation leading to new important results in those theories, giving international visibility to our work. The project will also include training of doctoral students among the partners and other kinds of exchange of students and postdocs between France and Chile, which has already proved to be a successful approach for interchanging knowledge and stating good scientifc collaborations in the past.	**PETITE Samuel** Université de Picardie Jules Verne, Laboratoire Amiénois de Mathématique Fondamentale et Appliquée, 33 rue Saint-Leu 80 039 Amiens Cedex samuel.petite@u-picardie.fr	**DONOSO Sebastián** Universidad de Chile, Centro de Modelamiento Matemático de Santiago de Chile, Beauchef 851, 4to piso, 8370456 Santiago, Chile sdonoso@dim.uchile.cl

C21E05 CLEMENT	Active emulsions and motors in a droplet	In this project, we aim at characterizing and harnessing the fluctuations of bacterial suspensions to build different models of "bacterial motors" using methods of emulsion fabrication and droplet encapsulation. The problem will be decomposed in two. On one hand, we will investigate the possibility to drive the motion of droplets by encapsulating magnetotactic bacteria and applying a magnetic field. Depending on the concentration, the collective bacterial motion inside the drop will be rectified by the external magnetic stimulus and produce a rotation and translation of the drop. We will also look at global self-organization processes induced in such novel activated emulsions. On a second hand, we will look at fluctuations due to bacterial motion (motile E.coli) induced on a passive object hence realizing an "active thermal reservoir" in a drop, with a "thermal probe" being the passive object. In such a bath of active particles, the passive object, being another droplet or a micro-fabricated particle of special design, will undergo agitation, resembling Brownian motion. However, the diffusive properties, the collective mixing behaviour, and the possibility of self-organization bestow on the driven passive objects novel emergent properties, far beyond what can be expected for classical Brownian motion.	**CLEMENT Eric** PMMH – ESPCI, UMR7636, Barre Cassan, 7, quai St Bernard, 75005, Paris eric.clement@upmc.fr	**CORDERO María Luisa** **D**pt de fisica, Universidad de Chile, Blanco Encalada 2008, Santiago (Chile) mcordero@ing.uchile.cl

C21E06 **CONTRERAS GARCIA**	New physicochemical models for predicting superconductivity	A room temperature superconductor is probably the most desired system in solid state physics. So far the greatest advances, cuprates, pnictides and number of others were obtained in a serendipitous way. As there is no clear theory for these superconductors, it is difficult to predict where progress will be made. In contrast the Bardeen-Cooper-Schrieffer (BCS) theory gives a clear guide for achieving high Tc, and hydrogen seems to be a main clue. Within this approach, the recently reported superconductivity at 190 K in compressed H2S has been arguably the biggest discovery in the field since the superconducting cuprates nearly 30 years ago. However, a microscopic understanding of why this particular material features such a strong coupling is still missing. We have recently shown that the underlying chemical structure and bonding need to be characterized for a good comprehension of the chemical composition-superconductivity relation. It is our purpose to analyze the electronic structure of localization of electron pairs thanks to theoretical chemistry techniques. The so called topological approaches which have been scarcely applied to solid state (never to superconductivity) should enable to characterize these electron pairs from the chemical point of view, a fundamental step in the understanding of the superconductivity-composition relation, no doubt the first step toward a rational inverse design of superconductors, our final aim.	**CONTRERAS-GARCIA Julia** Sorbonne Université, Laboratoire de Chimie Théorique UMR 7616, 4 Pl Jussieu 75005 Paris contrera@lct.jussieu.fr	**CARDENAS Carlos** Universidad de Chile, Las Palmeras, 3425, Ñuñoa, Santiago, Chile cacarden@gmail.com

C21E07 TUDOR	Stochastic and Statistical Analysis of Irregular Phenomena	This proposal concerns the applications of the stochastic analysis to the study of irregular phenomena. Many phenomena in physics, biology or economy are often modeled as an ordinary differential equation or as a system of ordinary equations. Such models assume that the observed dynamics are driven exclusively by an internal, deterministic mechanisms, without the influence of external random factors. However, physical, biological or economical phenomena are often exposed to external impredictible factors and a natural way to model such elements is to use stochastic processes or stochastic (partial) differential equations. It is therefore essential to understand and investigate the influence of noise in the dynamics and also to be able to estimate, predict the coeffcient that may affect the system. A common stochastic process that is considered as driven noise for irregular phenomena is the Brownian motion. This famous stochastic process has nice property: it is a martingale, it is a Gaussian process and is a Markov process. On the other hand, the complexity of real-world phenomena push the researchers in the last decades to consider more elaborated models. Such an example is the fractional Brownian motion. This is a Gaussian process, self-similar with stationary increments, which is neither semi-martingale nor a Markov process. It ts well with many models and its practical applications are notorious. Nevertheless, it is still Gaussian and, as we will explain below, some areas of applications show non Gaussianity in empirical data. We propose a systematic study of a class of non-Gaussian self-similar processes, the so-called Hermite processes, especially the generalized Hermite processes which can be defined for small Hurst parameter.. This is one topic what we plan to analyze. Another topic concerns particular types of stochastic differential equations (SDE) or stochastic partial differential equations, such as heat, wave or Burgers equations. Our intention to tackle unexplored aspects of these models which will be detailed below. Random irregular phenomena can be also modeled by assuming that the structure of the coefficient of the equation is not standard. Such an example is the Volterra type stochastic equation which constitutes another objective of our project.	**TUDOR Ciprian** UNIVERSITE de LILLE, Département de MATHEMATIQUES, CITE SCIENTIFIQUE , BATIMENT M2, 59655 VILLENEUVE d'ASCQ, ciprian.tudor@univ-lille.fr	**ARAYA Hector** Universidad de Valparaíso, Facultad de Ciencias, Instituto de Estadística , Gran Bretaña 1091, Valparaíso, Chile hector.arayaca@uv.cl

C21E08 MUÑOZ	Graphene as transparent current spreading electrode in silicon heterojunction solar cells	Crystalline silicon solar cells dominate the photovoltaic market with more than 90% of industrial production. Among them, silicon heterojunction solar cells (SHJ) have achieved outstanding efficiencies. In these cells, electrodes' high transparency and electron mobility are important to achieve high efficiencies and tin-doped indium oxide (ITO) is commonly used due to their suitable optical and electrical properties. Graphene overmatch ITO in optical transparency and electron mobility, however it has higher optical reflection and sheet resistance. The goal of this project is to analyze graphene performance as front and rear transparent current spreading electrode in SHJ cells and to address major drawbacks by tuning the number of layers and using an antireflection layer and a metal grid. With the proper structure, graphene could achieve remarkable optical and electrical properties and lower cells fabrications costs. For this purpose, we will transfer graphene to the front and rear sides (separately) of SHJ cells and characterize its structural, optical and electrical properties on the cells' doped textured surface. Graphene's impact on the cells' performance will be evaluated through measurements and simulations. In addition, we will study the inclusion of an antireflective layer and of an Ag grid to reduce sheet resistance. Through this research we intend to find graphene's impact as transparent current spreading electrode in SHJ cells and the relationship between cells performance and samples structural, electrical and optical properties. The collaborative work between the three institutions is essential to perform this project. Researchers at INES (France) have the expertise for fabrication and evaluation of SHJ cells and their components. Researchers in Chile (UTFSM and UA) have experience in growth and characterization of graphene and ultrathin layers, and in the study of photovoltaic solar energy regarding cells materials and performance through experiments and simulations.	**MUÑOZ Delfina** Institut National de l'Énergie Solaire, 50 avenue de Lac Léman 73375 Le Bourget-du-Lac delfina.munoz@cea.fr	**DEL CAMPO Valeria** Departamento de Física, Universidad Técnica Federico Santa María, Avenida España 1680, Valparaíso valeria.delcampo@usm.cl

C21H01 BAMBRIDGE	Réseau scientifique sur les pratiques traditionnelles pour la conservation et la gestion durable des îles en Polynésie française et à Rapa Nui/Scientific Network on Traditional Practices for Conservation and Sustainable Island Management in French Polynesia and Rapa Nui	Protected areas have become a vehicle for state territorialization and have often been used by states as a means to take greater control over Indigenous Peoples' territories, waters and lives. This pattern has been referred to as a "remarkable spatial convergence", which is especially evident in the Americas and the Pacific. Rapa Nui (RN) and French Polynesia (FP) have not been excluded from these processes. RN has been a scenario of various forms of state territorialization in the name of conservation. In RN over 40% of the island is a National Park and also recognized as a UNESCO World Heritage Site since 1995. In 2010 Chile established the Motu Motiro Hiva Marine Park in the Easter Island ecoregion, as one of the largest notake protected areas in the world. In 2018 was declared the Rapa Nui Multiple Uses Marine Protected Area in the whole Exclusive Economic Zone (EEZ) of Rapa Nui. In FP in the mid 1950s colonial rules started to protect emblematic terrestrial biodiversity. The same can be said about the marine areas of the French Polynesian archipelagos, which were largely ignored for decades up to 2004, when the *plan général de l'espace maritime* was created in Moorea. However, neither the indigenous communities nor the preservation of biodiversity had been on the agenda before the International Convention on Biological Diversity. The creation of a Man and Biosphere UNESCO site in the atoll of Fakarava in 1996 has largely been a development driven by the central authority of FP with limited involvement of the local population. As the socio-cultural dimension in conservation has been little present in the conservation processes in RN and FP, we propose to establish an interdisciplinary and international collaboration network on traditional practices used by local communities for island sustainable management and conservation in French Polynesia and Rapa Nui that can contribute to the study of the political implications of science/conservation in the field of Pacific Island studies.	**BAMBRIDGE Tamatoa** Ecole Pratiques des Hautes Etudes, UMR 3268 Centre de Recherches Insulaires et Observatoire de l'Environnement (CRIOBE). B 50518 Pirae, Tahiti, Polynésie française tamatoa.bambridge@criobe.pf	**ABURTO Jaime** Departamento de Biología Marina, Universidad Católica del Norte, Millennium Nucleus Ecology and Sustainable Management in Oceanic Islands (ESMOI). Larrondo 1281, Coquimbo, Chile jaburto@ucn.cl
C21H02 LAZZERI	North-South network of critical theory thinking about recognition and sociocultural conflits		**LAZZERI Christian** Université Nanterre, Département de Philosophie, 200 avenue de la République, 92000 Nanterre clazzeri@parisnanterre.fr	**BALBONTIN-GALLO Cristobal** Universidad Austral de Chile, Facultad de ciencias juridicas y sociales, Helena Haverbeck s/n, Valdivia, Chile. cbalbonting@gmail.com

C21S01 THOMAS-JUNIUS	Effets contralétraux et exercice excentrique chez le patient atteint d'AVC : impact clinique et mecanismes sous-jacents des adaptations neuromusculaires	Background. A typical sign after stroke is hemiparesis, which is the inability to move on one side of the body (i.e. eakness), which may result in a set of symptomatic changes in the neural control properties making hard to perform daily activities. Despite these neural and muscular alterations, it is possible to increase or regain muscle function on the affected side through exercise and rehabilitation. Eccentric exercise training is increasingly used in rehabilitation programs aiming to maximize recovery of muscle mass and strength of injured limbs or muscle wasting diseases. We have recently shown that unilateral eccentric strength training induced greater neuromuscular adaptations in the untrained contralateral arm after 4 weeks of immobilization compared to conventional concentric-eccentric coupled strength training in healthy subjects (Valdes et al., 2020). The implementation of eccentric actions into the training programs of the hemiparetic stroke survivors could be a valuable strategy to improve neuromuscular function of the affected side resulting in a better functionality during daily living activites and improved quality of life. Objective. The aim of this project is to investigate the effects of acute and chronic contralateral unilateral eccentric strength training and the nature of its adaptations (neural, muscular and their impact on functionality) as a clinical strategy to improve neuromuscular rehabilitation in hemiparetic stroke survivors in comparison with CIT therapy. Hyphotesis. We hypothetise that contralateral eccentric contractions will induce greater acute and chronic responses in the non-trained arm in healthy and stroke patients compared to concentric contractions. Furthermore, chronic adaptation will improve neuromusular function, functional performance and quality of life to a greater extent than CIT therapy in stroke patients. Methodology. This project will be divided in 2 parts. Part 1 will focus on acute effects of eccentric contractions in healthy (1A) and stroke (1B) patients, whereas part 2 will focus on chronic adaptations in stroke survivors. Study 1A will be conducted in Chile and France, and studies 1B and 2 in Chile only. Part of the preliminary experiments have already been conducted in France, with the collaboration of the Chilean team, in 2021 (neural and muscular setup by using magnetic and electric stimulation). Exercise. After an familiarization period, participants will attend two experimental sessions in order to evaluate the changes in the neuromuscular contralateral responses after 50 unilateral maximal eccentric contractions of the elbow flexors muscles. Contractions will be divided in series of 10 repetitions (5 x 10) with 30 s between series. Before, immediately post, 2 h (session 1) and 24 h (session 2) after the eccentric exercise, the neuromuscular function of the contralateral (non-exercised) limb will be evaluated in Part 1A and 1B. Briefly, neuromuscular assessments will include the evaluation of both muscular and central components responsible for force production capacity of the elbow flexors muscles. Then,The participants will perform unilateral eccentric resistance training of the elbow flexors muscles of the healthy side 3 times a week during 4 weeks on a preacher curl bench using adjustable dumbbells. Functional capacitie	**THOMAS-JUNIUS Claire** Université d'Evry Val d'Essonne (UEVE), Laboratoire de Biologie de l'Exercice pour la Performance et la Santé (UMR LBEPS), Bâtiment Maupertuis/3eme etage-bureau 03 S14 UFR SFA, 23 Boulevard François Mitterrand, 91000 Évry-Courcouronnes claire.thomas@univ-evry.fr	**Luis PEÑAILILLO** Escuela de Kinesiología, Facultad de Medicina de la Universidad Finis Terrae, Av. Pedro de Valdivia 1509, Santiago lpenailillo@uft.cl

C21S02 SPECHT	Regulation and adaptation of inhibitory synapses by neuroactive steroids	Neuroactive steroids (NAS) are promising pharmacological agents for the treatment of depression and stressrelated pathologies. Their sedative and anticonvulsant effects are thought to result predominantly from the allosteric modulation of inhibitory GABAA receptors, causing an increased inhibitory activity. However, the precise mechanisms by which NAS regulate network activity on the cellular level is not known due to the multitude of molecular targets as well as the lack of information about the effects of NAS on the receptor distribution in the neuronal membrane and the concommittant regulation of inibitory neurotransmission. In this project, we will systematically analyse the effects of GABAAR-specific NAS with known clinical profiles, namely allopregnanolone (ALLO) and SAGE-217, on inhibitory neurotransmission in cultured primary neurons. Hippocampal and spinal cord cultures will be exposed to ALLO and SAGE-217 for different durations and characterised by immunocytochemistry to determine short and long-term effects of the NAS on synapse composition and the connectivity of the neuronal network. The concentrations of NAS and their metabolites will be measured by gas chromatography coupled with tandem mass spectrometry to determine their pharmacokinetics, and to ensure the comparability of the data generated in the partner laboratories. We will characterise the effects of NAS treatment on inhibitory neurotransmission using electrophysiological measurements, as well as the consequences for the subcellular distribution of GABAARs and glycine receptors (GlyR), focusing on the equilibrium between synaptic and extrasynaptic receptors. To this aim, we will apply conventional and super-resolution imaging of fluorescently tagged GABAAR and GlyR subunits. For comparison, we will also investigate the effects of isopregnanolone (INN), the endogenous 3β-epimer of ALLO, as well as the synthetic gonexalonone (GR-3027), both of which are negative allosteric modulators of GABAARs, in order to distinguish between GABAAR-activity dependent and independent mechanisms. Together, these experiments will provide new information about the regulation of inhibitory neurotransmission by NAS on different time scales, from seconds to several days. In this way, our project will help to bridge the gap between the short-term regulation of GABAergic (and glycinergic) currents by NAS and the longterm adaptation of the network through homeostatic and/or anti-homeostatic processes.	**SPECHT Christian G.** DHNS, U1195, Université Paris-Saclay, 80 rue du Général Leclerc, 94276 Le Kremlin-Bicêtre christian.specht@inserm.fr	**YEVENES Gonzalo E.** Department of Physiology, University of Concepcion, Barrio Universitario S/N, 4030000, Concepcion, Chile gyevenes@udec.cl

C21S03 **CHATZIANTONIOU**	Role of Connexin 43 in the Activation of Antigen-Presenting Cells During Chronic Kidney Disease Progression	**Background.** Chronic Kidney Disease (CKD) is a worldwide health problem, which increases dramatically the risk of mortality. Although some therapies can control risk factors, there is no treatment able to prevent the CKD progression. CKD is characterized by renal dysfunction and fibrosis. Studies from the Chilean group suggest that the inflammation is a relevant mechanism at early stages of CKD. In this context, they propose that Antigen-Presenting Cells (APCs) represent an immune network in kidney that may mediate the pro-inflammatory status responsible for fibrosis in CKD. Connexin 43 (Cx43) is a crucial protein for gap junctions between neighboring cells, or for hemichannels at the surface of them. The French group has demonstrated that Cx43 is increased after renal damage. Interestingly, they have shown that inflammation and fibrosis are blunted by Cx43 blocking during CKD progression. Besides, it has been proposed that Cx43 regulates the immunological synapse orchestrated by APCs, opening a new field of investigation related to CKD progression. **Objective.** To determine the role of APCs during early CKD progression, and whether Cx43 in APCs is modified during the kidney inflammation driving to fibrosis. **Methodology.** CD11c.DOG mice, a transgenic model that allows to deplete APCs after Diphtheria Toxin administration, will undergo unilateral ureteral obstruction (UUO) in order to study the inflammatory/fibrotic status, and the renal Cx43 abundance. Also, renal APCs from Wild Type (WT)-UUO mice will be placed in culture to analyze their activation status in a Cx43-specific blocking context. **Project Significance.** Our results will provide relevant information concerning the role of APCs during CKD progression and will permit to discriminate whether Cx43 in renal APCs modulates the proinflammatory phenotype driving to fibrosis. This alliance will complement the Chilean and French projects developed in parallel, which involve the participation of several young scientists.	**CHATZIANTONIOU Cristos** Hôpital Tenon, INSERM UMR S 1155, 4, rue de la Chine, 75020 Paris christos.chatziantoniou@upmc.fr	**AMADOR Cristian** Universidad Autónoma de Chile, Laboratorio de Fisiopatología Renal, El Llano Subercaseaux 2801. Santiago 8910060 cristian.amador@uautonoma.cl

C21U01 VAN HULLEBUSCH	Siderophores assisted Biorecovery of Technology Critical Elements: Gallium (Ga), germanium (Ge) and indium (In) from Chilean tailings	High techs such as communications, renewable energies, displays are heavily dependent on metals such as germanium (Ge), indium (In) and gallium (Ga). These metals are used in photovoltaics, fiber optics, liquid crystal displays, and light emitting diode among others. The supply of these metals is essential for the continuous supply of high-tech devices. Recycling of these metals from mining wastes such as tailings with high content of these element using siderophores, a specialized group of molecules synthetized by some microorganisms such as bacteria to scavenge iron, emerges as an attractive strategy to obtain selectively critical elements from an abundant waste in Chile supporting a circular economy by converting waste to value. Bacteria living in alkaline high land lagoons in northern Chile where iron has a very low availability, precipitated in the form of hydroxides, oxides and carbonates, require a production of highly specific siderophores and with a high affinity to insoluble forms of iron, to allow the survival of bacteria in extreme environments. These siderophores will be used for the extraction of valuable and critical elements from mining tailings with an environmentally friendly technology. Thus, exploiting of siderophores for these metals recovery can be very interesting. However, no work has been carried out to recovery these metals from tailings using siderophores. Siderophores has been shown to bind selectively to Ga, In and Ge and their application in tailings aim to develop ambitious and highly innovative technology for the recovery of these critical elements.	**VAN HULLEBUSCH Éric** IPGP, Equipe ACE, UMR CNRS 7154, 1, rue Jussieu, 75238 Paris cedex 05 vanhullebusch@ipgp.fr	**ROJAS ARAYA Luis Antonio** Universidad Católica del Norte, Departamento de Química - Facultad de Ciencias, Av. Angamos 0610, Antofagasta . l.rojas@ucn.cl
C21U02 VALOIS	Development of geophysical and modeling approaches to support sustainable groundwater management in semi-arid and Mediterranean areas	North-central Chile and south-east France are facing semi-arid and Mediterranean climates, respectively. In addition to being historically exposed to water supply challenges, these regions are sensitive to climate change, which is increasing aridity. Thus, the pressure on water resources to meet domestic, agricultural and industrial demands is high and growing. As precipitation in these regions is low and highly variable, the water stored underground is a key adjustment variable to mitigate years with low precipitation. Hence, groundwater resources need to be carefully managed in order to secure water supply in the years and decades to come. To tackle this challenge, this project aims to develop geophysical characterization and groundwater modeling approaches to support sustainable groundwater management.	**VALOIS Rémi** Avignon Université, UMR 1114 EMMAH, Pôle Agrosciences, 84140 Avignon remi.valois@univ-avignon.fr	**BRESCIANI Etienne** Centro de Estudios Avanzados en Zonas Aridas – CEAZA, Geociencias, 1305 Raul Bitran, La Serena, CHILE etienne.bresciani@ceaza.cl