FRANCE - CHILI : TRENTE-DEUXIEME APPEL A PROJETS ECOS Sud - ANID (2024)

Tableau des projets sélectionnés AAP ECOS Sud-ANID 2024

Code projet	Titre du projet	Abstract	Responsable français	Responsable Chilien
PC24B01 **Devient** **C24B01**	bivalOMICS Understanding the Effects of Climate Change on Shellfish Aquaculture through Hologenomics	The crucial role of microorganisms in natural and human-managed ecosystems and the services they provide is now widely acknowledged. These largely invisible entities participate in all ecosystem processes and interact with macroscopic species upon which we depend for food production. Microbiomes influence animals' and plants' health, function, and adaptive capacity - the microbial communities that closely associate with their hosts - which strongly interact with free-living microorganisms. Despite their importance, little is known about how environmental variations affect these interactions and how they will respond to climate change. The "Understanding the Effects of Climate Change on Shellfish Aquaculture through hologenomics (BivalOMICS)" proposal will take the challenge to decipher how the interplaying between the microbial community of larvae and substrate and the marine environment drives the resilience and population connectivity of marine invertebrates exposed to climate change. Here, we open the gate to the idea that the microbiota associated with the substrate where marine larvae settle might have functional roles beyond conditioning the settlement surface. We hypothesize that microbial keystone taxa drive the hologenome involved in marine invertebrates' survival. BivalOMICS will explore the complexity of multiple environmental stressors in the ocean to assess the vulnerability of shellfish aquaculture. We propose using mussels and oysters as model species, given their role as ecological engineers, the depth of current knowledge on their larval and settlement dynamics, and their importance for shellfish aquaculture in Chile and France. The proposal will be conducted in collaboration between the University of Concepción, Chile (UDEC) and the University of Caen, France (UNICAEN). All the researchers and graduate students involved have extensive experience in next-generation sequencing, functional genomics, and microbiome data analysis.	**RIVIERE Guillaume** Université de Caen Normandie Campus 1, esplanande de la Paix, 14032 Caen Cedex **guillaume.riviere@unicaen.fr**	**GALLARDO ESCARATE Cristian** Universidad de Conception, INCAR **crisgallardo@udec.cl**
PC24B04 **Devient C24B02**	lncRNAs control gene regulatory networks under dual phosphate starvation and salt stress in Arabidopsis roots	Root hairs (RHs) have a crucial role in anchoring the plant to the soil, they provide symbiotic relationships with soil-dwelling organisms, allowing access to water and nutrients that are vital for microorganisms. This highlights the deep importance of RHs in plant developmen and physiology. Multiple dynamic environmental elements significantly impact the different stages of RH morphogenesis, such as the availability of nutrients (e.g., phosphorus, nitrogen, iron), water scarcity, soil temperature, strength, texture, and microbial interactions. Pi deficiency significantly impacts root system architecture (RSA) and subsequently the plant fitness, altering shoot-to-root ratios and reducing production yields in major crops . Increased salinity in the soil is an important concern for agriculture due to the loss of yield crops. The soil salinity has increased in the past few years by the rising of sodium chloride levels in the groundwater, and the secondarily salinization affects the arable land. There is currently a scarcity of information concerning the interplay between phosphate deficiency, and salinity stress concurrently. Therefore, investigating these stresses in tandem presents an opportunity to uncover novel pathways that may be harnessed for crop enhancement. Long non-coding RNAs (lncRNAs) have been recognized as important regulators for plant responses to abiotic stresses including drought, salt, and nutrient deficient situations. We proposed to study these lncRNAs in their roles in low phosphate and salt stress specifically in RHs. Furthermore, we plan to use GRN analysis to investigate the specific cellular roles of long non-coding RNAs (lncRNAs) at the individual cell level. In this project we proposed to identify the molecular mechanism by which specific lncRNAS are able to control gene regulatory networks acting under dual stress low phosphate and salt in single plant cells, RHs.	**BAZIN Jeremie** INRAE, Institut des Sciences des Plantes - Paris-Saclay (IPS2) UMR 1403, Batiment 630 Rue Noetzlin 91190 Gif-sur-Yvette **jeremie.bazin@inrae.fr**	**ESTEVEZ Jose Manuel** University Andres Bello, Centro de Biotecnologia Vegetal, Av. Republica 330. 3r piso. Santiago **jose.estevez@unab.cl**

PC24E01 **Devient C24E01**	Qualitative behaviour of nonlinear PDE from physics and biology convergence, hypocoercivity, functional inequalities, nonlinear stability, and applications.	This research proposal aims at studying models from dispersive dynamics, kinetic the-ory and mathematical biology. One of the main scientific contributions of this proposalis to obtain qualitative and quantitative results for variational problems and partial dif-ferential equations. Five major topics are proposed: Relativistic quantum mechanics,Dirac operators and functional inequalities; Symmetry breaking in weighted functionalinequalities and weighted diffusions; Long time dynamics in dispersive PDEs in onespace dimension; Long-term dynamics in nonlocal models from ecology; Hypocoerciv-ity and decay to equilibrium in kinetic models with heavy tails. The expected results willhelp improving the understanding of various real-life phenomena, including populationdynamics, relativistic quantum mechanics, and diffusion processes.The first topic focuses on establishing connections between spectral problems and func-tional inequalities for Dirac operators. We will analyse the symmetry of optimal spinorsin inequalities of Keller-Lieb-Thirring type, and obtain the solitary waves of Soler-typenonlinear Dirac equations as optimizers of a nonlinear inequality. The second topicaims at characterising a symmetry range in which optimal functions for weighted logarithmic Sobolev and Caffarelli-Kohn-Nirenberg type inequalities are radially symmetric.A nonlinear carré-du-champ method will be adapted to prove entropy-type estimates.Rigidity, perturbation, and stability issues will be addressed. The third topic is about theasymptotic stability of topological and non-topological solitions for a class of dispersivePDEs in dimension one. A new method is proposed, based on perturbations in weightedspaces with exponential weights, on the so-called virial identities, and on existence re-sults of breathers. The fourth topic is concerned with the description of evolutionarystable strategies of long-term dynamics of integrodifferential models that arise in themodelling of structured populations, with the goal of obtaining qualitative and quan-titative insights on the concentration dynamics. Finally, the fifth topic will extend theDolbeault-Mouhot-Schmeiser method to study large-time behaviour of solutions of ki-netic equations in which the confinement potential exhibits heavy tails.The goals of this project are multiple: strengthen and create new collaborative researchnetworks between France and Chile in the field of nonlinear partial differential equationsand applications; publish co-authored articles in top-tier journals and disseminate theresults in international meetings; promote the training of students on emerging topics.In order to achieve these goals, yearly workshops will be organized in France and Chileto account for the progresses of the investigations as well as encouraging participationof students and young researchers. International training of doctoral and postdoctoralresearchers will be ensured by allocating resources from this project for exchanges. Theviability of the project is sustained on the expertise of the members of both teams, in-cluding experts in partial differential equations, nonlinear analysis, calculus of varia-tions, and mathematical physics. Their successful collaboration record and significantpast contributions to the above mentioned fields is a major asset for this proposal.	**BOUIN Emeric** Université Paris-Dauphine – PSL, CEREMADE, Place du Maréchal de Lattre de Tassigny, 75775 Paris **bouin@ceremade.dauphine.fr**	**ZUÑIGA Andrès** Universidad O'Higgins, ICI. **andres.zuniga@uoh.cl**

PC24E06 **Devient C24E02**	Understanding graphs and locality via local certification	This project is in the domain of theoretical computer science and discrete mathematics, more precisely at the intersection of the theory of distributed computing and graph theory. The key notion is the one of local certification. For concreteness, let us start with an example. Consider that the nodes of a network (ie the vertices of a graph) want to collectively check that the network is acyclic (that is, there is no cycle, it is a tree). They cannot do this locally by checking only their neighbors in the network (because locally a long path is indistinguishable from a long cycle). In local certification, one assumes that the nodes are given some small labels to start with (the certificates) that help them decide whether the property studied is satisfied or not. For example, for the acyclicity testing, a good idea is to give to every node in its label the distance to some arbitrary node (the root). Then the nodes can check that these distances are consistent: if the network is indeed acyclic, every node will have either a certificate zero, or will have exactly one neighbor with certificate smaller than its own, and if it is not acyclic, for any certificate assignment at least one node will detect an inconsistency. This notion originates from the study of fault-tolerance in distributed computing: one can prove that in order to design an algorithm that is self-stabilizing (that is, that can cope with arbitrary memory corruption) it is often essential to design a local certification of the output. Basically, the algorithm will compute, in addition to its standard output, a certification of it that will allow the nodes of the network to check locally that the solution is correct. But we are interested in another point of view on local certification, that emerged more recently. The main measure of performance for a local certification is the size of the certificates used: the smaller, the better. This makes sense from a distributed computing perspective because this size coincides with the memory and message size used in the process. But it is also very relevant from a combinatorics perspective as a measure of locality. If a property needs large certificates, it means that a lot of non-local information is need to locally verify it, thus it is a global property, whereas if a property can be verified without certificates, or with just a few bits per certificates, it is local. The goal here is to understand the notion of locality of graph classes with the lens of local certification. The two PIs have been working on this idea recently, sometimes together but mostly independently, and the project will allow to strengthen this collaboration and to allow PhD students to dive into this fascinating topic. The work will be articulated around several research directions and will aim at solving major conjectures in this area.	**FEUILLOLEY Laurent** CNRS & Université Claude-Bernard-Lyon-I, Équipe GOAL, Laboratoire LIRIS, Nautibus building, La Doua campus, Villeubanne **laurent.feuilloley@cnrs.fr**	**MONTEALEGRE Pedro** Universidad Adolfo Ibáñez, Facultad de Ingeniería y Ciencias **p.montealegre@uai.cl**
PC24E09 **Devient C24E03**	Large scale numerical simulations of northern Chile for seismic risk assessment : application to Mejillones case	When assessing seismic risk at a city scale, local site conditions (topography, mechanical properties of the soil, etc.) can significantly affect the destructiveness potential of an earthquake. The characterization and assessment of these site effects, in addition to the evaluation of the probability of occurrence of a destructive earthquake into a particular region is a critical issue. Traditional methods to anticipate soil motion, use prediction equations developed empirically by regression analysis of historic seismic data. However, in the case of singularities, such as basin with particularly deep and variable sedimentary thicknesses, the use of this type of equation is not adequate because they are not designed to reproduce exceptional situations. Therefore, it is necessary and possible to use digital simulation tools, to numerically generate seismic scenarios of ground motion. A numerical code to carry out such studies has been developed. The seismic phenomenon is simulated from the source to the site, using a representative model, which includes the complexity of the medium, traversed by the seismic waves. This approach introduces uncertainties that must be quantified, controlled and reduced by validating the results against records on a real study site. The objective of this collaborative work is to set up a digital laboratory, allowing a reliable analysis and quantification of seismic risk for any given region of the world. This work aims to numerically study the effect of the geometric structure of soil and subsoil, sedimentary infills and its spatial variability on the prediction of soil motion at regional scale. More specifically, the project will use the SEM3D code, in the city of Mejillones, the deepest known basin in Chile, which is one of the most seismic countries in the world.	**LOPEZ-CABALLERO Fernando** CentraleSupélec, LMPS - Laboratoire de Mécanique Paris-Saclay, Université Paris-Saclay, 8/10 Rue Joliot-Curie, 91190 Gif-Sur-Yvette **fernando.lopez-caballero@centralesupelec.fr**	**SAEZ ROBERT Esteban Patricio** Pontificia Universidad Católica de Chile, Département de Génie des Structures et Géotechnique,Santiago **esaezr@uc.cl**

PC24E10 **Devient C24E04**	DATA inversion for in-situ soot metrology: conventional vs neural networks	Incomplete combustion is a source of nanoparticles known as soot or black/brown carbon. These particles have a detrimental effect on human health, as well as on the environment through their contribution to global warming. It is important to continue the effort to accurately characterize these nanoparticles using in-situ approaches in order to better understand their formation directly in flames. The teams involved in this project have considerable expertise in this field, particularly in the characterization of soot formation in axisymmetric flames. Indeed, thanks to a first ECOS/ANID project, the two teams have merged their skills to propose to the community an innovative way of interpreting emission and extinction measurements at different wavelengths, and have developed an improved angular light scattering method resolving certain problems relating to the measurement volume. Today, the two teams are able to carry out complementary measurements capable of providing almost all the measurands important for a complete characterization of soot particles. Since this work, the two teams have developed different strategies for processing the data. CORIA has developed an improved Abel inversion that takes into account the trapping effect and minimizes sensitivity to experimental noise. CORIA aims to combine all the inverted data to extract all the measurands in a complete and "classical" way. This approach is called SAT. On the other side of the Atlantic, EC2G is experimenting with recent original algorithms based on neural networks (called ANNABel), which seem to bring noise-free results very quickly through an integrative approach. But confidence in this method is limited by the "black box" nature of the technique. The current project called DATINV aims to produce a common database of experimental data on a selection of flames of interest, including for aeronautics, complementing the application of both techniques to extract maps of measurands such as volume fraction, aggregate size and number concentration, primary sphere size, maturity. In parallel, both techniques will be tested on virtual flames generated by EC2G. The aim of the project is to validate the neural network approach by comparing the results obtained on synthetic and experimental data with the conventional approach. If ANNAbel proves to provide robust results with a significant saving in computation time, the two teams will retain this original method and adapt it for other analyses. Finally, the project will contribute to public knowledge of soot formation by providing the community with numerous detailed results for gaseous and liquid fuels. This project, spurred on by the previous collaboration between the two teams, will benefit from their complementary skills in an area not covered by the previous project, since it involves numerical simulations and the problem of inversion, which is essential for determining robust and reliable data on soot formation.	**YON Jérôme** Institut National des Sciences Appliquées Rouen Normandie, CORIA UMR 6614, Site Universitaire du Madrillet - BP 12 76801 Saint Etienne du Rouvray **jerome.yon@coria.fr**	**ESCUDERO Felipe** UTFSM, EC2G, Valparaiso **felipe.escudero@usm.cl**
PC24E11 **Devient C24E05**	Cost-Effective 3D-Printing of Antennas for Space and Ground Wireless Communications	The research proposal underscores the role of wireless communication systems in modern society, particularly with the advent of sixth-generation (6G) networks and the Internet of Things (IoT). However, the realization of these applications hinges upon the production of a large number of reliable and affordable compact wireless systems, posing challenges in terms of size, weight, and cost. To address these challenges, the proposal advocates for the use of 3D printing, to fabricate high-frequency devices, offering better materials management at a lower cost compared to traditional manufacturing methods. Specifically, the project focuses on the 3D printing of antennas, crucial for establishing wireless communication links, leveraging the expertise of the PUCV in Chile, ENAC and ISAE in France. The collaboration aims to develop low-cost antennas with enhanced radiation properties through the innovative use of 3D printing techniques, benefiting from Chile's proficiency in AM and France's expertise in antenna design and structured material analysis. This collaboration extends to doctoral, postdoctoral, and master's student research projects, fostering knowledge exchange and technology transfer between the two countries. For instance, doctoral research in France aims to develop compact dielectric resonator antennas (DRAs) and Huygens' sources utilizing engineered anisotropic dielectrics, while ongoing projects in Chile explore the implementation of 3D-printed topologies for satellite applications and mmwave frequencies. The proposal emphasizes the long-term impact of this collaborative effort on advancing wireless communication systems and fostering innovation in both Chile and France. By addressing key challenges in antenna design and manufacturing, the project seeks to pave the way for the development of costeffective and reliable wireless sensors, thus contributing to the future growth of ground and space communication technologies.	**MORLAAS-COURTIES Christophe** Ecole Nationale de l'Aviation Civile, ENAC/TELECOM, 7, avenue Edouard Belin 31400 Toulouse **christophe.morlaas@enac.fr**	**PIZARRO TORRES Francisco** Pontificia Universidad Catolica de Valparaiso, Laboratorio de telecomunicaciones, Valparaíso **francisco.pizarro.t@pucv.cl**

PC24E12 **Devient C24E06**	Dynamical systems associated to nonconvex optimization problems	This research project aims at providing iterative methods for solving some classes of nonconvex optimization problems. While there are efficient algorithms for solving convex optimization problems, the extension toward nonconvex settings is far from being trivial. The project focuses on three principal research directions that converge toward providing new methods for solving nonconvex optimization problems. First, we will investigate some classes of generalized convex functions (in particular, (strongly) quasiconvex ones). Then we plan to study the convergence properties of dynamical systems of first and second order associated with optimization problems consisting in minimizing (strongly) quasiconvex smooth functions possibly with respect to geometric constraints, and variational inequalities governed by (strongly) pseudomonotone operators. From these dynamical systems usable algorithms for solving the considered problems should be derivable via time discretization. The last axis of research in this project extends the previous one toward nondifferentiable functions, by considering differential inclusions instead of dynamical systems, involving different subdifferential notions. Besides the scientific results, we aim at developing an international research network on nonconvex optimization, including the researchers involved in this project and other scientists interested in topics like Nonconvex Optimization and Dynamical Systems as well as practitioners dealing with applications that can be recast as nonconvex optimization problems, and training students in the research areas described in this proposal in order to gain them as potential new members of the Optimization community, and mentoring postdoctoral researchers in order to facilitate their insertion on permanent positions at academic institutions. Two workshops will be organized in the framework of this project (one in Chile and one in France), and they should be open to the community, providing thus suitable starting points for the planned international research network. To achieve these goals, the project team consisting of Felipe Lara (project coordinator of the Chilean team, specialized in Generalized Convexity), Adriano Da Silva (Associate Researcher, specialized in Differential Geometry), Stephanie Caro (Associate Researcher, specialized in Nonconvex Optimization), Cristián Vega (Postdoctoral Researcher, specialized in Applied Optimization and Machine Learning), Margarita Quispe Tusco (PhD Student), and Jhon Eddy Pariapaza Mamani (Master Student) from Chile, and Sorin-Mihai Grad (project coordinator of the French team, specialized in Convex Analysis and Numerical Optimization), Samir Adly (Associate Researcher, specialized in Variational Analysis and Dynamical Systems), Titus Pinţa (Postdoctoral Researcher, specialized in Numerical Optimization), Nhan Huu Nguyen (potential PhD Student), Nail Baloul (potential PhD Student) from France will work in a system of clusters, one for each topic of the proposal, formed on the basis of the complementary expertise of the participants and comprising a balanced number of senior researchers, young researchers and PhD and Master's students. The project's viability is ensured by the expertise of the research group, which brings together experts in Convex Analysis, Numerical Optimization, Variational Analysis, Differential Equations, Differential Geometry, and other research fields. Their complementary profiles, successful collaboration history and significant contributions to the field further strengthen the project's potential. Additionally, we plan to attract additional researchers and students to collaborate on specific research questions proposed in this application.	**Grad SORIN-MIHAI** École Nationale Supérieure de Techniques Avancées Paris, Unité de Mathématiques Appliquées – UMA, 828, Bvd. des Maréchaux, 91120 Palaiseau **sorin-mihai.grad@ensta-paris.fr**	**Felipe LARA** Universidad de Tarapacá, Arica, Instituto de Alta Investigación **felipelaraobreque@gmail.com** , **flarao@academicos.uta.cl**

PC24E13 **Devient C24E07**	Building Bridges between Reliability Theory and Survival Analysis: A kernel method approach.	Time-to-event data, also known as time-to-failure or survival data, refers to a type of data where the outcome of interest is the time until the occurrence of a specific event, such as the death of a patient in a clinical trial or the system failure. There are mainly two disciplines that have focused on this type of data: Survival Analysis, a branch of Biostatistics, and Reliability Theory, a branch of System Engineering. Although both disciplines deal with the same type of data, their objectives and applications seem to be different. On one hand, Survival Analysis, which is prominent in medical, biological, and social sciences, revolves around understanding the underlying patterns of survival times. Survival Analysis typically deals with statistical inference problems such as estimation of the so-called hazard function as well as hypothesis testing problems. On the other hand, Reliability, which is mostly used in Engineering applications such as Materials Science, Energy and Power Systems, and Industrial Manufacturing, focuses on assessing the probability that a system, component, or product operates without failure for a specified duration in order to use a system with safety. Unfortunately, both research communities do not talk a lot, with has lead to important differences in language and research ideas. The aim of this project, then, is to build bridges between Survival Analysis and Reliability Theory. For that, we will work on problems of common interest to both disciplines. Our main technical tool will be the use of Kernel Methods, which are method developed by the Machine Learning community in order to process complex data, but that have not yet studied extensively in time-to-event data context. By the end of the project we expect to contributed toward closing the gap between both communities, and at the same time, toward including new tools in the study of time-to-event data that can be used in both disciplines.	**PAROISSIN Christian** Université de Pau et des Pays de l'Adour, Laboratoire de Mathématiques et de leurs Applications, Avenue de l'Université, BP 1155 64013 Pau Cedex **christian.paroissin@univ-pau.fr**	**FERNANDEZ Tamara** Universidad Adolfo Ibañez, Facultad de Ingeniería y Ciencias, Campus Viña del Mar, Viña del Mar, Valparaíso **t.a.fernandez@uai.cl**
PC24E14 **Devient C24E08**	Upscaling operation characteristics of small diesel-ammonia fuelled internal combustion engines to heavy duty applications	Chile has a large mining sector, which has made great strides towards carbon neutrality. The PUC research group has links with the mining truck engine industry and aims to contribute to the decarbonisation of these engines. The collaboration with the University of Orléans is important for acquiring the scientific and technical expertise needed to carry out scientific experiments on the combustion of ammonia in internal combustion engines. The expected results of the exchange between the PUC and the PRISME laboratory at the University of Orléans are twofold. On the one hand, the PUC research team should benefit from the in-depth expertise of Professor Rousselle and his team in ammonia combustion and ammonia-fuelled internal combustion engines, which will enable it to build the experimental set-up in Chile and carry out conclusive tests with the large-capacity engine, more quickly than would be possible without the transfer of knowledge. On the other hand, the PRISME laboratory team will be able to help the PUC team analyse the results obtained from the large-scale experiments with the large-displacement engines and will have access to the data to validate them against the results obtained with the small-scale engines. In addition, collaboration on the numerical modelling of the combustion process and the operational behaviour of large-scale engines using CFD will be initiated and will benefit both parties.	**ROUSSELLE Christine** Université d'Orléans, PRISME, 8 rue léonard de Vinci, 45072 Orléans **christine.rousselle@univ-orleans.fr**	**Jahn WOLFRAM** Pontificia Universidad Católica de Chile, Departamiento di Mecanica, Santiago **wjahn@uc.cl**

PC24H02 **Devient C24H01**	Recompositions partisanes et nouvelles radicalités : perspectives croisées entre le Chili et la France	Ce projet s'inscrit dans la continuité d'une coopérations scientifiques préalable : un projet Ecos-Conicyt C05H01 (2006-2008) co-dirigé par Frédéric Sawicki en France et Stéphanie Alenda au Chili, intitulé "Permanences et Changements de l'engagement politique dans les démocraties représentatives, France-Chili". Les résultats de ce projet ont été présentés dans divers Congrès et séminaires avant d'être réunis dans un numéro spécial de la Revista de Sociología de l'Université du Chili paru en 2011. Nous y abordions déjà les mutations des formes de l'engagement politique et du militantisme, affectant aussi bien les organisations politiques dans leur fonctionnement que les mouvements sociaux et plus largement la société tout entière. A rebours de la littérature sur le sujet qui tendait à mettre en exergue le déclin des partis de masse, leur « cartellisation », la fin des allégeances partisanes et plus généralement la fin du militantisme, nous nous sommes demandé comment s'articulaient le recul des formes traditionnelles d'activisme politique et l'émergence de nouvelles tendances en matière de participation et d'engagement politiques. En France comme au Chili ont vu le jour de nouvelles formes institutionnelles d'adhésion, de contestation et de compétition pour les positions de pouvoir politique, que nous avons cherché à analyser tant du point de vue du fonctionnement interne que des modes d'enracinement locaux et sociaux des formations politiques. Á droite, l'étude des socialisations et trajectoires des dirigeants de l'Union Démocrate Indépendante (UDI), principal héritier de la dictature militaire chilienne, s'est nourrie des travaux de Julien Fretel sur le centre-droit français, notamment de l'idée d'une affinité élective entre un certain esprit du catholicisme et un habitus militant permettant d'une part de « faire institution » ; et instituant d'autre part une relation au parti qui doit beaucoup à des types d'investissement non partisans (religieux, humanitaires) dans le cadre desquels les dirigeants accumulent ressources, capitaux mais aussi des « savoirs en matière d'action collective » (Fretel, 2011). Sur l'UDI, Stéphanie Alenda a montré que la cohésion du parti s'est maintenue malgré des conflits générationnels qui sont apparu avec le temps, grâce à la mise en place de mécanismes d'homogénéisation interne. Ceux-ci tendent à renforcer les dispositions de départ des nouveaux entrants recrutés au sein de réseaux religieux et universitaires, favorisant la reproduction de cette « entreprise doctrinaire » (Alenda, 2014). Lors de cette opération de recherche, nous avons identifié de nouvelles formes de participation extrapartisanes appréhendées en partant d'un questionnement sur les mouvements sociaux au sein des deux pays. Cet angle d'étude nous a permis d'explorer les formes non conventionnelles de participation politique et de comprendre ce qui détermine à la fois les jeux de contestation politique et les actions qui ont pour effet de modifier l'agenda des organisations politiques et plus largement des gouvernants. Nous avons ainsi pu mieux saisir comment s'articulent les organisations partisanes et les mouvements sociaux qui sont, de toute évidence, porteurs de changements mais aussi de dynamiques susceptibles d'ébranler à tout instant le jeu politique dominant. Le mouvement altermondialiste en France a servi ici de point de référence. Vivace alors même qu'il est issu de traditions militantes marginalisées et d'organisations syndicales minoritaires à l'image de la Confédération Paysanne de José Bové, il incarnait alors la possibilité de sortir d'un contexte d'atonie militante (celle des années 1980 en France) sans le secours des partis et au profit d'un « militantisme expert » largement fondé sur le haut niveau de diplôme de ses protagonistes. La perspective généalogique adoptée a permis non seulement d'appréhender les filiations du mouvement (tiers-mondisme, écologisme) et reconversions de leurs membres, mais encore les recompositions de cet espace de mobilisations en France à partir des années 80 ou celles du registre protestataire construit dans les années soixante à quatre-vingt. Bien que ce modèle n'ait pas pris dans les pays du Sud, lors même que sa vocation était de « penser global » et de porter la parole des « nations défavorisées », certaines de ses thématiques et formes d'action ont accompagné les mobilisations écologistes des années 2010 et le mouvement étudiant en 2011, avec l'apparition de slogans tels que « Un autre Chili est possible ».	**SAWICKI Frédéric** Université Paris 1-Panthéon-Sorbonne, Centre européen de sociologie et de science politique, Département de science politique 1 place de la Sorbonne 75231 Paris cedex 05 **frederic.sawicki@univ-paris1.fr**	**ALENDA Stéphanie** Universidad Andrés Bello, Facultad de Educación y Ciencias Sociales, Las Condes, Santiago **salenda@unab.cl**

PC24H04 **Devient C24H02**	Patrimoines au pluriel : interculturalité, nouvelles muséologies et mémoires en conflit dans les institutions culturelles et éducatives au Chili et en France	This project aims to use the notion of 'plural heritages' as a starting point for analysing the impact of interculturality and demands for recognition of the memories and heritages of minority social groups (migrants, indigenous peoples, dissidents, children, the rural world) on the institutions of culture, heritage and education. Schools and museums are recognised as essential cultural institutions from which practices, knowledge and representations are developed and transmitted to form the fabric of our social relationships and give them substance. As such, they are called upon to take part in the many debates arising from the profound transformations of our contemporary worlds and the changes they call for. In Chile, as in France, recent social mobilisations and movements for the recognition of minorities express a profound demand for a renewal of the role of cultural institutions, in favour of a broadening of the notion of heritage and greater inclusiveness. The theoretical debates surrounding the school and the museum have paved the way for more heterogeneous and situated notions of heritage that highlight conflicting memories, forgotten narratives, symbolic contestations and otherness, moving away from a monumental conception of heritage associated with a form of coloniality of knowledge. Based on case studies from Chile and France, this project aims to highlight the role of educational and cultural institutions in promoting intercultural dialogue and developing a more inclusive conception of heritage.	**CORP Mathieu** Aix-Marseille Université, Centre Aixois d'Études Romanes (CAER EA 854), 29 avenue Robert Schuman, 13100 Aix-en-Provence **mathieu.corp@univ-amu.fr**	**Marisol FACUSE MUÑOZ** Universidad de Chile, Núcleo de sociología del arte y de las prácticas culturales, Ñuñoa, Santiago **marisolfacuse@uchile.cl**
PC24H10 **Devient C24H03**	SEED - Social and Environmental Effects of Data connectivity: Hybrid ecologies of transoceanic cables and data centers in Chile and France	ENG The rapid advancement in artificial intelligence (AI) and foundation models has heightened the global demand for computational resources, data storage, and human labor for training, leading to significant socio-environmental and labor impacts. This research project explores these impacts through a dual geographical lens, focusing on the axes of Valparaíso-Santiago in Chile and Marseille-Paris in France. These regions exemplify the dichotomy between the investment in physical infrastructures in coastal areas and the urban-based marketing of data enrichment data annotation work, highlighting the dovetailing of human and ecological elements within AI development. Through our analysis of the selected regions, this project seeks to bridge perspectives from the global South and North, fostering a dialogue that recognizes the social and environmental factors shaping AI's evolution. By advocating for a nuanced recognition of these interdependencies, the project proposes new frameworks for coexistence with AI, aiming to establish sustainable practices that recognize all contributors to the AI ecosystem. This initiative not only highlights the need for a more conscientious approach to AI development but also aims to set a precedent for future technological innovations, ensuring they are grounded in ethical and inclusive practices. The research adopts a critical perspective on the ethical responsibilities towards the territories and communities deeply intertwined with AI technologies. This approach is vital for developing a comprehensive understanding of AI's footprint on human and natural environments, as well as crafting ethical frameworks that respect and integrate the needs of both human and other-than-human entities involved in or affected by AI development. This collaborative effort between French and Chilean academic institutions, conducted by the DiPLab and FAIR research team, aims to dissect and make visible the entire AI value chain—from production and development to labor, usage, and environmental impacts. By shedding light on the "hybrid ecologies" of AI, where technology coexists with human and natural systems within specific territories, this project challenges the prevalent narratives of linear progress and dematerialization typically associated with AI technologies.	**CASILLI Antonio** Télécom Paris | Institut Polytechnique de Paris, Télécom Paris, 19, place Marguerite Perey, CS 20031, F-91123 Palaiseau Cedex **antonio.casilli@ip-paris.fr**	**TIRONI RODO Martín** Pontificia Universidad Catolica de Chile, Nucleo Milenio – FAIR, Pontificia Universidad Católica de Chile, Providencia **martin.tironi@uc.cl**

PC24E03 **Devient C24S01**	Mathematical and numerical models for parameter identification in soft tissue	The aim of this project is to develop mathematical models that can help characterize the anisotropy of the heart and the elastic properties of soft tissue. Among the many complex components of the heart, its muscular fibers are the main drivers of anisotropy, expressed in the propagation of the electrical signal for contraction, and the contraction pattern itself, the latter being what allows the heart to effectively pump blood to the entire body. There is extensive literature regarding mathematical models for describing these fibers, but the actual physics that drive their observed orientation has remained so far an open question. The Chilean group of researchers in this proposal was able to establish mathematically that the seeked physics were those of liquid crystals, more specifically the Frank-Oseen model for a left ventricle model, a fact that had only recently been observed experimentally in France. This project is instrumental to formalize the collaboration between these groups into deepening the understanding of the physics governing cardiac fibers. Such insight could yield profound answers regarding the observed configuration of the fibers and their morphogenesis. For the estimation of elastic properties, a prominent non-invasive technique is elastography. For this, we will develop joint research about two topics that we have already discussed among the French and the Chilean team. The first one is related to the identification of close inhomogeneities in the presence of corrosion type interfaces or boundary conditions, and the corresponding asymptotic formulas to achieve this. The second is the proposition and the mathematical analysis of one-dimensional or two-bidimensional simplified elastic models to approximate the identification of three dimensional elastic inhomogeneities from linear or planar type ultrasound measurements.	**SEPPECHER Laurent** Ecole Centrale de Lyon, Institut Camille Jordan, 36 Av. Guy de Collongue, 69134 Écully **laurent.seppecher@ec-lyon.fr**	**BARNAFI WITTWER Nicolás Alejandro** U Catolica de chile, Instituto de Ingeniería Matemática y Computacional, Av Vicuña Mackenna 4860 **nicolas.barnafi@uc.cl**
PC24S02 **Devient C24S02**	The role of thalamo-striatal circuits in reward encoding	We focus here on the dorsal striatum which is related to motivation behavior while the dorsal striatum is more related to motor planning. Anatomical evidence demonstrates that the paraventricular thalamic nucleus targets primarily the nucleus accumbens and dorsal striatum, and is the only thalamic structure to do so (Vertes and Hoover, 2008, Li and Kirouac, 2012). Since there are virtually no reciprocal projections from the nucleus accumbens to the paraventricular nucleus, it suggests that this thalamo-striatal projection is mainly feedforward. Furthermore, functional results support a role for the paraventricular nucleus in commanding contextual reward-associated cues and motivated behaviours, particularly in drug-seeking behavior (Martin-Fardon and Boutrel, 2012, James and Dayas, 2013). Thus, the input-output connectivity pattern, with main synaptic inputs arising from prefrontal cortex, and dominant synaptic outputs targeting nucleus accumbens, and neural activity driven by positions the paraventricular thalamic nucleus literally in the middle of the mesocorticolimbic dopaminergic pathway (Kizer et al. 1976, Takada et al. 1990) and suggests its relevance in regulating reward encoding and motivated behaviors. The classic reward model proposes that the dopamine mesocorticolimbic pathway (originating in VTA) transforms sensory stimuli into salient incentives (Schultz, 1997), with a key role being played by the nucleus accumbens, and interface between limbic and motor systems, as the encoder of hedonic states (Karlezon and Thomas, 2009). However, recent anatomical and physiological evidence has revealed a particular thalamic region, the paraventricular nucleus, to be almost entirely dedicated to control neural activity in the nucleus accumbens (Berendse and Groenewegen, 1991, Li and Kirouac, 2012, Hsu et al., 2014). The paraventricular nucleus can control neural levels of activity in the nucleus accumbens by presynaptic regulation of midbrain dopaminergic terminal and by direct glutamatergic synapses onto medium spiny neurons in the nucleus accumbens, which seem to be activated during salience signaling and associative learning (Parsons et al., 2007). Possibly, descending cortical afferents are slow and exert cognitive control (i.e., post-reward representations and hedonic states). Instead, ascending hypothalamic inputs are fast and regulate feedforward control (i.e., pre-reward representations, prediction and expectancy). Therefore, we propose that the paraventricular thalamic nucleus is a network node that regulates reward encoding by the balanced activation of its specific ascending and descending synaptic pathways, and thus plays a key role to link thalamocortical and basal ganglia systems.	**DESTEXHE Alain** Institut des Neurosciences de Paris Saclay, Neurosciences Computationnelles, NeuroPSI, 151 route de la Rotonde, 91400 Saclay **alain.destexhe@cnrs.fr**	**FUENTEALBA Pablo** Pontificia Universidad Catolica de Chile, Neurophysiology lab, Santiago **pjfuentealba@gmail.com**
PC24U01 **Devient C24U01**	The interplay between crustal stress field and geofluid migration close to fault	This project aims to understand and quantify the stress state and permeability changes near regional fault intersections based on state-of-the-art numerical models supported by extensive field and geophysical observations. For this, we have selected two Southern Andean Volcanic Zone (SAVZ) sites, evados de Chillan and Cordon Caulle Volcanic Complex, representing typical fault intersection typologies of the SAVZ. The plumbing systems of these volcanic complexes depend on the relative orientation of these faults, the farfield stress, and the hydro-mechanical properties of the crust (strength, permeability, temperature at depth). We will use and adapt two 3D numerical codes to 1) implement one model on the role of permeability on the rupture conditions, to simulate large deformations on a crustal scale (tens of km), and 2) develop another code considering the temperature dependence of fluid and solid properties, to	**GERBAULT Muriel** Geosciences Environement Toulouse, Terre interne Lithosphère,	**CEMBRANO José** Pontificia Universidad Catolica de chile, Santiago, Department of Structural

	intersections: Insights from 3D numerical models	simulate the Darcy-poro-elastoplastic coupling at kilometric scale. Comparison with approaches accounting for rate-and-state seismic behavior will enlighten the self-consistent process of fluid-fault interactions and the change in properties naturally induced by intersecting faults topology. This collaboration will make it possible to contrast the formation and evolution of geothermal systems in distinct geodynamic contexts (the Andes and the Pyrénées) and train students in undertaking a comparative approach between data and modeling.	OMP, 14 av. Edouard Belin, 31400 Toulouse **muriel.gerbault@get.omp.eu**	Geotechnical Engineering **jcembrano@uc.cl**
PC24U03 **Devient C24U02**	Characterizing the sites of massive seeds in the early Universe	Understanding the formation and evolution of galaxies from Cosmic Dawn to the present day is a central topics in modern extragalactic astronomy. In the last decade, this field has entered a golden era with the advent of large space observatories and multiobject spectrographs, pushing the limits of the observable Universe ever further. Large samples of distant galaxies have been cataloged, with several hundred identified within the first Gyr of the Universe. However, before 2022, our view of the early Universe was biased toward the brightest primeval galaxies. The arrival of the James Webb Space Telescope has been a game changer in understanding the formation and evolution of these early galaxies. Thanks to its higher resolution and sensitivity, it is now possible to study the environment of the brightest galaxies. Preliminary results from Webb show that distant galaxies may have formed in overdense regions, with the brightest galaxies harboring active black holes. However, these results have been based on photometric surveys; spectroscopic follow-up is now needed to better understand the formation and evolution of primeval galaxies and the first Active Galactic Nuclei (AGN). This ECOS-Sud project aims to initiate a collaboration between a French team well-recognized in the observational study of distant galaxies and a Chilean team with leading expertise in AGN studies. It will address two key questions: (i) what are the physical properties of the first protoclusters and how did they evolve, and (ii) what are the properties of the first AGN and how abundant were they within the first billion years of the Universe. We will first identify protocluster members in JWST images and AGN in JWST and Euclid images. Then we will conduct spectroscopic follow-up of all our targets. This collaboration will leverage access to Guaranteed Time Observations on MOONS/VLT, PFS/Subaru, and EMIR/GTC, as well as other instruments (ALMA, JWST, Magellan) through General Observer (GO) time.	**LAPORTE Nicolas** Aix-Marseille Université, Laboratoire d'Astrophysique de Marseille, 8 rue Frédéric Joliot Curie – 13013 Marseille **nicolas.laporte@lam.fr**	**BAUER Franz** Pontificia Universidad Catolica, Instituto de Astrofisica, Facultad de Física Pontificia Universidad Católica de Chile - Santiago **fbauer@uc.cl**
PC24U04 **Devient C24U03**	Comparison of temperature and pH proxies based on organic compounds in French and Chilean lakes	A better understanding of past climate variations and their interactions with geosphere and biosphere is essential to apprehend future climatic changes and their impact on earth critical zone. As no direct environmental measurement prior to the 19th century is available, our knowledge of past climate variations mainly relies on the use of environmental proxies. Most of the available paleoenvironmental proxies were developed for and applied to oceanic environments, which are more homogeneous than continental ones. Nevertheless, it is essential to also have reliable proxies which can be applied to continental settings in addition to oceanic archives to assess climatic variability over the continents and to improve our systemic understanding of past global environmental changes. Lakes are especially of interest for paleoclimatologists thanks to the high sensitivity of lacustrine archives as recorders of past environmental conditions. Membrane lipids produced by some microorganisms can be used as environmental proxies. Microorganisms are able to adjust their membrane composition in response to the prevailing environmental conditions. Thus, the structure of glycerol dialkyl glycerol tetraethers (GDGTs), which are membrane lipids biosynthesised by archaea and some bacteria, is known to be related to environmental parameters. These molecules are increasingly popular as there are the only only microbial organic proxies which can be used for temperature reconstructions in both aquatic and terrestrial settings. Nevertheless, the development of new environmental proxies, independent and complementary to GDGTs, is crucial to improve the reliability and accuracy of continental reconstruction. Recently, specific organic compounds produced by bacteria (3-hydroxy fatty acids) were proposed as new potential temperature and pH proxies in soils. Nevertheless, almost no data is available on these molecules in lakes. The main objectives of this bilateral project will be (i) to investigate the applicability of 3-OH FAs as new temperature and pH proxies in lakes and (ii) to concomitantly constrain the limits and conditions of use of existing GDGT-based proxies in such settings. To this aim, the source(s) of microbial lipids in French and Chilean lakes will first be assessed by comparing their abundance and distribution in in soils, particulate organic matter and lake sediments. Then, we envision to develop calibrations between temperature/pH and distribution of microbial lipids in sediments from lakes in France and Chile. Last, these calibrations will be applied to long-term paleoenvironmental reconstructions from lacustrine cores collected in France	**HUGUET Arnaud** UMR 7619 METIS Sorbonne Université/CNRS/EPHE, Campus P. et M. Curie 4 pl Jussieu CC 105 75005 Paris **arnaud.huguet@sorbonne-universite.fr**	**CONTRERAS Sergio** Universidad Católica de la Santísima concepción, Laboratorio de Ciencias Ambientales (LACA), Departamento de Química Ambiental, Facultad de Ciencias **scontreras@ucsc.cl**

		and Chile. This interdisciplinary project represents a unique opportunity to gather together French and Chilean researchers with complementary expertise for the development of an environmental tool. It will be based on an integrated approach coupling state-of-the-art organic geochemistry and molecular biology applied to samples from present and past times.		
PC24U06 **Devient C24U04**	Scientific cooperation for the study of extreme events in the past in an area highly sensitive to climate change, the Coquimbo region, Chile.	Floods, extreme storms, and tsunamis are natural disasters that have marked the history of the Chilean coast, causing a high risk to the population and a tremendous economic challenge due to the high level of destruction of these events. In this study, we will use sedimentary archives from the Elqui River site and the coastal zone of the Coquimbo region to reconstruct past extreme events (floods and tsunamis) using sedimentological (grain size), geochemical (XRF), geophysical (geo-radar), pollen, and geochronological (14C and 137Cs) analyses. The objectives of the project are (1) to reconstruct the extreme events in this highly inhabited area, unexplored for natural disasters and anthropogenic impact, and to compare them with other events already identified in the Los Choros and Pachingo wetlands, located at the northern and southern tips of the Coquimbo region (see Fig. 1 in the project description form); and (2) to study the impact of these extreme events on this densely populated area by crossing data from sedimentary archives, historical archives, and climatic models. This information would help to better constrain the magnitude of extreme events and identify different events and past climate reconstructions from climate models. Based on the results, we propose to fill gaps in the knowledge of the frequency and intensity of past events and environmental conditions related to climate variability. The CLAP project funded this study and was supported by three institutions: two Chilean (CEAZA-ULS and UCN) and one French (CNRS M2C Laboratory, Unicaen), in addition to the participation of five senior researchers (three French and two Chilean), one post-doctorat, one doctoral student, and one master's degree. Main objective: Identify past extreme events by improving previous information in the region, allowing to better constrain the magnitude ofextreme events and environmental conditions prevailing based on climatic models.	**DEZILEAU Laurent** Laboratory Morphodynamique Continentale et Côtière -Universite Caen, Morphodynamique Continentale et Côtière UMR CNRS 6143 M2C, 24 rue des Tilleuls, 14 000 Caen **laurent.dezileau@unicaen.fr**	**MUÑOZ Praxedes** University Catolica del Norte, Biologia Marina-Oceanografia Quimica, Coquimbo **praxedes@ucn.cl**
PC24U07 **Devient C24U05**	AQUASOL: Franco-Chilean Innovation for Solar Wastewater Treatment with Micropollutants, Microorganisms and ARG Elimination Focus	ECOS SUD AQUASOL explores the integration of an electrochemical filter press cell with a raceway pond reactor (SEC-RPR) to advance solar photoelectro-Fenton (SPEF) processes. This innovative approach belongs to the WATER2 group in Chile. The primary objective is to evaluate the efficiency of this hybrid system for the degradation of micropollutants (MPs), microorganisms, and antibiotic resistance genes (ARG) in wastewater treatment plant (WWTP) effluents. The study will focus on several key areas: (i) optimizing the generation and distribution of electrogenerated hydrogen peroxide (H2O2) within the reactor under various current densities and supporting electrolytes, (ii) identifying and monitoring MPs using HPLC-MS/MS, Microorganisms and ARG by microbiologic assays(iii) applying the SPEF process for simultaneous degradation of a mixture of MPs, Microorganisms and ARG,accompanied by kinetic studies and cost analysis, and (iv) treating real secondary effluents from a WWTP to assess decontamination and disinfection efficiency. By SPEF process in an SEC-RPR will completely eliminate MPs, Microorganisms and ARG in secondary effluents. This will be achieved through adequate electro-generation and distribution of H2O2, and efficient elimination of MPs, microorganisms, and ARG in both simulated and real wastewater scenarios. Enhanced water quality is anticipated compared to current WWTP effluents. AQUASOL will assess the feasibility of the SPEF process for eliminating MPs, microorganisms, and ARG from municipal WWTP effluents using an innovative SEC-RPR as a potential system for industrial application in wastewater treatment. Coolaborative objectives include: quantifying primary MPs, microorganisms, and ARG in secondary effluents; investigating the elimination of MPs, microorganisms, and ARG by SPEF using SEC-RPR and analyzing reaction intermediates and toxicity of treated water.	**LE ROUX Julien** Université Paris-Est Créteil, LEESU **julien.le-roux@u-pec.fr**	**SALAZAR GONZÁLEZ Ricardo** Pontificia Universidad Católica de Chile, Water 2 **Ricardo.salazar@uc.cl**
PC24U08	Cold, warm, and hot: diffuse baryons in dense protoclusters	The z = 2-4 epoch is a key moment in the history of the Universe where the most massive dark matter halos, the "protocluster" precursors to present-day galaxy clusters, first became "hot"'. At this point, the accretion of cold gas from the cosmic web, long thought to happen through cold streams, became inefficient and the halo environment started to negatively bias the evolution of their constituent galaxies, setting them onto a path of gas exhaustion and, ultimately, deep quiescence. However, while compact protoclusters can be selected relatively easily by their galaxy content, constraining their diffuse baryon budget, i.e., the different phases of gas coexisting in their centres, has proven to be much more difficult. Cold, non-emitting gas can only be traced through the absorption it induces in the spectrum of bright background sources, while the signal of hot phase, if present at all, suffers from surface brightness dimming	**Emanuele DADDI** Commissariat à l'Énergie Atomique et aux Énergies Alternatives,	**Raphaël GOBAT** Pontificia Universidad Católica de Valparaíso,

Devient C24U06		and contamination from highly active galaxies at this epoch. As such, the predictions of cold stream accretion have yet to be conclusively proven, although a recent correlation between the luminosities of giant Ly-alpha halos residing in high-redshift groups and critical halo mass has provided new, tantalising evidence. To remedy this uncertainty, we have carried out a large observation campaign aimed at compact protocluster candidates, both at farinfrared wavelengths and in the rest-frame UV, to constrain their physical properties and probe the tentative link between the emission of the diffuse gas and cosmological accretion.	Département d'Astrophysique, Orme des Merisiers, Bât 709, 91191 Gif sur Yvette **emanuele.daddi@cea.fr**	Instituto de Física, Curauma, Valparaíso **raphael.gobat@pucv.cl**