



ANNUAL REPORT 2021

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THE PRESIDENT EDITORIAL

2021 marked the year when Le Studium Loire Valley Institute for Advanced Studies (IAS) adopted its new 2021 - 2027 strategic plan to better fulfil its mission of internationalisation of research in Centre-Val de Loire. Through three pillars: a reinforced international identity, sustained international and regional partnerships, financial sustainability. Quality being the common key word.

From calls for projects, to which numerous external peer reviewers bring their contribution -through a 3-day international scientific council meeting establishing a final selection of the best scientific projects/candidates among a large variety of domains- followed by a high quality welcome reserved to researchers (and possibly their family), up to the organisation of numerous scientific and social meetings during their time in residence, all Le Studium actors and partners offer a remarkable environment to all scientists joining Le Studium Loire Valley IAS. This gives an international signature recognised by our fellows and this largely benefits the regional research ecosystem and Le Studium contribution to international scientific exchanges.

This year 2021 also marked the time when Le Studium was able to join the European University ATHENA, as an associate partner of the University of Orléans. As well as preparing the integration of Le Studium in other ambitious regional and international partnerships. Fruitful results in cooperation and scientific advances should be evidenced in the following reports.

Thanks to our partnerships who strongly help us in this positive way of living: our territorial partners : the Centre-Val de Loire Regional Council, Orléans Metropole, and our scientific partners: Orléans and Tours Universities, BRGM, INRAE, CEA, INSERM, INSA, CNRS, not forgetting industrial members in our committees who spend time to lighten us on the best ways to foster innovation. It is impossible not to mention the daily involvement of Le Studium staff who are the daily quality builders of our activities.

Despite the Covid19 pandemic, 28 laboratories have welcome a selected international researcher in 2021 and these fellows were able to take part in and organise international scientific gatherings. You will discover the variety of scientific profiles through this report.

Would you like to learn more about a specific topic? You may also get a deeper insight by consulting «Le Studium Multidisciplinary Journal» on our website as it offers access to the end-of-stay synthesis reports and related publications of their research work. That is also a way to contribute to open science.

I wish you the same passion when travelling in so various scientific areas, topics and personalities. For us, science has human faces, smiles and personalities and discovery is just based on this multidisciplinary landscape. Respect of differences and friendship also belong to the "Le Studium experience". It is part of an awe attitude.

We are proud of our fellows, host scientists and laboratories, they give the image of an open science, seed of international cooperation and peace.

Mr Yves-Michel Ginot,
President



IDENTITY & MISSION

*LE STUDIUM Loire Valley Institute for Advanced Studies (IAS):
a unique transdisciplinary approach to support research and innovation in
the Centre-Val de Loire region and a multidisciplinary intellectual and human
space favouring international scientific exchanges*

Established in 1996 and inspired by the historical, geographical and human cultures of the Loire Valley, LE STUDIUM Loire Valley Institute for Advanced Studies (IAS) is an internationally recognised regional agency, whose mission is to create in the Centre-Val de Loire region an outward looking dynamic for the scientific community that includes public and private research stakeholders. Having welcome hundreds of highly qualified scientists, the institute contributes to the strengthening of human capital for research, development and innovation and participates in the valorisation of regional scientific research and economic influence.

The programmes designed by LE STUDIUM enable the institute to support international collaborative research projects and the mobility of experienced international researchers across all scientific disciplines. The selections and recruitments happen through calls for applications and call upon high standards applying to LE STUDIUM Scientific Council and human resources management. The institute develops in parallel a rich scientific events programme with the organisation of international conferences, workshops, transdisciplinary seminars, webinars and lectures for the promotion of the scientific culture and knowledge. Each selected researcher benefits from a dedicated assistance to facilitate her/his smooth and efficient installation and integration in the region and from visa preparation, a fully furnished housing adapted to the configuration of her/his family to all administrative and technical burdens.

The Smart Loire Valley programme, for the period 2015-2021, operated with a co-financing from the European Union in the framework of the Marie Skłodowska-Curie Actions (COFUND) for the mobility of experienced researchers, increasing its selection and recruitment capacity. As an appreciated partner supporting the smart specialisation strategy (S3) of the Centre-Val de Loire Regional Council, the IAS covers a wide array of key strategic scientific topics in the framework of the Ambition, Research and Development programmes (ARD 2020 and now ARC CVL programmes).

In 2021, LE STUDIUM integrated the ATHENA European University Consortium through a partnership with the University of Orléans with the responsibility of a programme for Visiting Researchers and international Events.

LE STUDIUM's actions have extended to the regional thematic research networks (Biotechnocentre, MiDi, Féri, MotivHealth...) for which resources were made available to organise events and mobilise researchers.

Based in the city center of Orléans at the Hôtel Dupanloup, the International University Centre for Research, the IAS maintains deep interactions with all regional cities, research structures and stakeholders. It enjoys prestigious premises and exceptional facilities offering international visiting and regional researchers a memorable experience and increasing its attractiveness to welcome high-level talents in the Centre-Val de Loire region.

At the interconnection between fundamental research and innovation, LE STUDIUM benefits from a strong regional network of scientific partners, and works in close collaboration with all regional research stakeholders and intermediaries, as well as higher education and research institutions:

- University of Orléans, University of Tours, INSA Centre-Val de Loire, ESAD Orléans
- National research institutes: BRGM, CNRS Centre Limousin Poitou-Charente, CEA Le Ripault, Centre INRAE Val de Loire, Inserm
- Poles of Competitiveness and clusters: Cosmetic Valley, Polymeris, Dream, S2E2, Polepharma, Vegepolys
- Other organisations and agencies: Maison des Sciences de l'Homme Val de Loire, Euclide, Dev'Up, Centre-Sciences, CCI, etc...

LE STUDIUM Loire Valley Institute for Advanced Studies' awards are selected thanks to the support and expertise of the LE STUDIUM Scientific Council composed of twenty-five renowned scientists who regularly dedicate some of their precious time to evaluate research projects and candidacies.

LE STUDIUM Loire Valley Institute for Advanced Studies offers visiting scientists an original intellectual and human space, which favours interdisciplinary exchanges and debates, guided by the three necessary conditions required for a creative activity, namely Curiosity, Imagination and Intuition.

SCIENTIFIC VISION & SURROUNDINGS

*From fundamental research to innovation
and socio-economic development*

LE STUDIUM Loire Valley Institute for Advanced Studies is strongly imbedded in the Centre-Val de Loire region's research landscape. With 25 years of experience and holding a prestigious portfolio of regional and international research programmes, LE STUDIUM's activities contribute to spreading light on its regional actors and partners. The focus of its mission remains to build the human capacity for research and scientific knowledge and to foster socioeconomic development and innovation. LE STUDIUM's expertise lies in attracting and managing a growing flow of global research exchanges, creating new scientific value chains, and contributing to the emergence of innovative, collaborative research and enterprise activities. The impact of new knowledge on the economy is incremental, but the cumulative effect is substantial.

In November 2015, LE STUDIUM was awarded by the European Union Horizon 2020 COFUND scheme in the category of the Marie Skłodowska-Curie Actions for mobility of scientists. The Smart Loire Valley Fellowship Programme (SLV) enabled LE STUDIUM to select and attract a larger number of

experienced scientists who came to spend a one-year full time residency in the Centre-Val de Loire region. This award brought a six-year co-financing to the initial support provided by the Centre-Val de Loire Regional Council for five hundred and sixty-six months of research. It brought substantial benefits and visibility to hosting laboratories and to the entire regional research ecosystem. This programme continues beyond this grant and continues to offer Fellowship, Professorship, Visiting Researcher, Visiting Artist and Consortium awards

LE STUDIUM's Scientific Council reviews each year all the filed applications in the Smart Loire Valley general calling upon a wide network of international scientists to carry out a fair and transparent evaluation process. Other recruitments and awards happen in the framework of the Ambition, Research and Development smart specialisation programmes initiated by the Centre-Val de Loire Regional Council in which LE STUDIUM contributes as a key partner for the implementation of international actions and scientific exchanges.



This past year, despite the Covid-19 sanitary crisis, LE STUDIUM has attracted and welcomed twenty-eight international researchers for one hundred and twenty months of research. These awards were across diverse disciplines from the social sciences, natural sciences, environmental sciences and material and energy sciences.

The monthly transdisciplinary seminars, LE STUDIUM Thursdays, praised by all participants have become over time a not-to-miss intellectual space for exchanges. They enable Research Fellows to advance their presentation skills, to gain a deeper understanding of all regional research activities, to experiment concrete transdisciplinary exchanges and to enhance visibility of host laboratories. PhD students are invited to attend, an opportunity that allows them to validate transversal credits and increase their scientific culture and knowledge. Events organised in 2021 have again demonstrated the diversity of research projects represented in the faculty of fellows and the creative interactions that emerged in all discussions. Their virtual digital format even engaged a larger community to connect and take part. Thankfully, a few in-person seminars and social events could be organised.

Awards of selected candidates include the opportunity to have LE STUDIUM finance the organisation of Conferences and Workshops; these multidisciplinary events organised in partnership with regional host laboratories attract a large number of leading international researchers to the Centre-Val de Loire region each year. Their medium-size format and peculiarity offer the ideal scenery for the creation of close and fruitful discussions, which often result in new ideas for

research and international collaborations. This past year again, the digital format of events in the era of Covid-19 appeared as a new dynamic, as it has enabled worldwide connections. The online storage and accessibility of presentations beyond the conference time contributes even more to the general public's awareness of research and facilitates the transfer of scientific knowledge to a wider audience; these events keep the local community informed about regional research activities and have become increasingly popular. Partnerships with universities and other local actors have been essential to guaranty visibility and participation to these events.

2021 also revolved around a new phase of strategic planning for the next period 2021-27, fixing objectives and new targets to reach for the organization. Interdisciplinary exchanges and international partnership will be at the heart of the new strategy.

LE STUDIUM remains an international, outward-looking partner offering opportunities to access and develop fundamental research projects across all scientific fields. These opportunities are essential to lead to new knowledge and create the fund from which the practical application of knowledge must be drawn. LE STUDIUM's mission nurtures this process closely linked to innovation, together with its members and partners, to achieve quality socio-economic outcomes for the Centre-Val de Loire region and for the scientists who carry out these research projects.



THE SMART LOIRE VALLEY PROGRAMMES

The Smart Loire Valley General Programme

The Smart Loire Valley Programme call for applications is open from November each year to February the next year. It offers different formats of awards (residency, visit, networking). The Smart Loire Valley Programme aims to foster international scientific exchanges and collaborations and to build human capacity and scientific knowledge for research, development and innovation in the Centre-Val de Loire region. It is open to all scientific disciplines and is a precious tool to access funding to develop fundamental research projects and to create or extend international collaborations. For the period 2015 to 2021, the programme operated with a co-financing from the European Union in the framework of the Marie Skłodowska-Curie Actions - COFUND (Co- Funding of regional, national and international programmes for the mobility of experienced researchers) for the Fellowships award.

Events and networking actions organised by LE STUDIUM aim at creating synergies between academic disciplines and links with the industrial world in order to increase interdisciplinary research and translational research to stimulate socioeconomic development. Independent external peer reviewers and an international independent Scientific Council assess and select the best candidates and innovative research projects. To be eligible, applicant researchers must be nationals or long-term residents of a country other than France and comply with the European mobility rules.

LE STUDIUM RESEARCH

FELLOWSHIP *

This award enables experienced international researchers to work in a host laboratory for twelve consecutive months. The award is designed to offer internationally competitive researchers the opportunity to discover and work in nationally accredited laboratories with international renown in the Centre-Val de Loire region. A salary, fully furnished housing, logistic and administrative support, specific training opportunities, and funding to organise one international event are associated with the award.

LE STUDIUM RESEARCH

PROFESSORSHIP

This award enables an experienced international Professor to work in a host laboratory, to participate in research, research team building and postgraduate teaching and mentoring. The Professorship residency consists in four periods of three months in the Centre-Val de Loire region (twelve months in total in four consecutive years). A salary, fully furnished housing, logistic and administrative support, specific skills acquisition, and funding to organise one international event are associated with the award.

LE STUDIUM

VISITING RESEARCHER

This award enables experienced international researchers wishing to visit and work with a laboratory in the Centre-Val de Loire region with personal resources, to enter the LE STUDIUM scientific community. The award offers fully furnished housing, full logistic and administrative support, specific training opportunities, funding to organise an international event and integration in the region for a three to twelve-month residency.

LE STUDIUM

VISITING ARTIST

This award enables experienced international artists wishing to visit and work with one or more laboratories in the Centre-Val de Loire region with personal resources, to enter the LE STUDIUM scientific community. The award offers fully furnished housing, full logistic and administrative support, specific training opportunities, funding to organise an international event and integration in the region for a three to twelve-month residency.

LE STUDIUM RESEARCH

CONSORTIUM

This award enables the creation of a team of five researchers (under the leadership of one researcher or research team from the Centre-Val de Loire region) and funds its regular gatherings for a full week twice a year over two years (four meetings in total over two years). The consortium projects have well-defined research objectives, a work-plan to implement and milestone goals to achieve between meetings. They can serve different objectives and consist in a solid basis to build a sustainable collaboration among a small group of international partners.



* The SMART LOIRE VALLEY Fellowships Programme received H2020 co-funding from the European Union Research Agency (Marie Skłodowska-Curie Actions, COFUND contract #665790) for Fellowships awards granted between 2015 and 2019.

The Ambition Research & Development Programmes

The long-term Socio-economic development of the Centre-Val de Loire region, in a period of economic fragility, depends on the strength and growth of quality research, development and innovation.

The Centre-Val de Loire Regional Council has initiated a series of smart specialisation programmes, starting in 2013, to implement the EU Smart Specialisation Strategy. These programmes and bids were designed to generate socio-economic impact by providing support to create strong regional research in various fields and develop excellence centres of international scale, stimulate innovation, job creation and socioeconomic dynamism in the territory.

Through these large research programmes, the Centre-Val de Loire Regional Council supports the strengthening of quality research in diverse targeted strategic domains to foster the development of first-class poles to enhance research and innovation activity in the region:

- ARD 2020 & ARD CVL Biomédicaments (biopharmaceuticals),
- ARD 2020 & ARD CVL Cosmétosciences (cosmetics),
- ARD 2020 PIVOTS (environmental metrology and engineering),
- ARD 2020 Intelligence des Patrimoines (cultural and natural heritage),
- ARD 2020 LAVOISIER (renewable energies).

LE STUDIUM stands as an official partner within these regional ARD 2020 and ARD CVL programmes. It leads on the internationalisation actions by providing expertise and services to recruit international experienced scientists and organises actions and events to boost international scientific exchanges and collaborations as well as to valorise research work carried out in the region.

ARD 2020 & CVL BIOPHARMACEUTICALS



A drug is any substance or composition presented as having properties for treating, preventing or diagnosing disease in humans or animals. Biopharmaceuticals in the strict sense of the term are molecules that have the characteristic of being produced from living organisms or their cellular components. These molecules are intermediate between chemical drugs and organisms' intrinsic biologics. By definition, a biopharmaceutical is any drug whose active substance is a therapeutic macromolecule produced by living organisms. Biopharmaceuticals are overwhelmingly protein-based, mainly represented by non-living vaccines, therapeutic antibodies, enzymes, protein hormones and growth factors. Being proteins, they currently have to be administered by injection.

The proportion of biopharmaceuticals in the drug market has dramatically increased over the past decade. The Centre-Val de Loire region is at the cutting edge of research in the pharmaceutical sector with strong capabilities of multidisciplinary regional research teams. Since 2013, the development of biopharmaceuticals is a regional priority with effective budget lines to support research and to facilitate innovative inter-sectorial industrial development and partnerships for socioeconomic development.

The **Biopharmaceuticals** programme aims to:

- Develop a flagship research and development pole on biopharmaceuticals.
- Configure the biopharmaceuticals field by inter-sectorial development and innovation in the pharmacy/health sectors through start-ups and SMEs, including established local and regional based multinational companies.
- Promote the transfer of technologies/competences to existing and new businesses.
- Support the development of new competences for the sector.

The Biopharmaceuticals Programme is driven by the University of Tours and mobilises actors in the pharmaceutical sector, from fundamental research to production, in order to develop tomorrow's biopharmaceutical treatments and production centres in the Centre-Val de Loire region. A number of innovative projects including academic and industrial partnerships covering a wide spectrum of biological molecules and domains receive funding to bring immediate outcomes: vaccines, therapeutic antibodies, nucleic acids, lipoproteins, bio- production of medicines...

Between 2014 and 2021, LE STUDIUM has recruited nine scientists for long-term residencies, who have highly contributed to the objectives of the programme.



ARD 2020 & CVL COSMETOSCIENCES



In an international framework characterised by changing regulatory regimes and increasing harsh competition, research and innovation are key factors to ensure smart specialisation and sustainable economic development of territories and stakeholders. In the very well-established perfume and cosmetic industry of the Centre-Val de Loire region, the **COSMETOSCIENCES** Programme aims at giving a significant impetus to research projects with a strong character of innovation to unlock industrial development blockages by opening the door to new concepts and enabling the creation of new startups and link with industries. It fosters French leadership in the sector and the leadership of the Centre-Val de Loire region, particularly with regard to sustainable cosmetics.

Anchored in the Centre-Val de Loire region, the Cosmetosciences Programme revolves around the structuring of research at the national level on this cosmetic theme. It brings twelve laboratories and twenty-three research teams together, and is driven by the University of Orléans. It strives to increase the visibility of cosmetic research and funding with the recruitment of PhD students and postdoctoral fellows for collaborative projects between academia and the cosmetic industry. The programme covers the whole value chain of cosmetic products.

The scientific scope has been defined to specifically respond to the scientific challenges of the cosmetic fields according to 3 three development axes:

- Naturalness and ecofriendly processes
- Characterisation of biological activity and product safety
- Formulation & sensoriality

Between 2015 and 2021, LE STUDIUM has recruited six scientists for long-term residencies who have highly contributed to the objectives of the programme.



ARD 2020 INTELLIGENCE DES PATRIMOINES



An interdisciplinary research programme dedicated to innovation, training and scientific development, Intelligence des Patrimoines offered a new understanding of cultural and natural heritage.

INTELLIGENCE DES PATRIMOINES was an interdisciplinary scientific research and innovation programme that served the tourism heritage economy in the Centre-Val de Loire region and offered new education and employment perspectives. It consisted in an unprecedented approach to promote the territory, combining the scientific research with socio-economic stakeholders, with the objective to design new innovative services and products. It gathered the efforts of thirty-three laboratories and three hundred and sixty researchers from Tours and Orléans, under the leadership of the Centre for Higher Studies of the Renaissance (University of Tours/CNRS).

The Intelligence des Patrimoines Programme focused on five major interdisciplinary topic projects of research for the development of interdisciplinary scientific activities:

- Chambord Château
- Vine and Wine
- Gastronomy, Health and Wellbeing
- Loire and Rivers
- Monuments, Parks and Urban Gardens

and proposed a transversal heterogenous digital data platform that enabled the collection and presentation of all developed activities and products (HeritageS platform). It offered new multidisciplinary and professional training courses with Master and Research Doctoral levels (École Supérieure en Intelligence des Patrimoines) and has created a thematic academic incubator – the Smart Tourism Lab - for the development of startups on the regional territory to support entrepreneurial projects for the promotion and renewal of the tourist experience around heritage. Through a unique transdisciplinary approach, it has developed valorisation and mediation tools offering new experiences for visitors.

Between 2016 and 2021, LE STUDIUM recruited two scientists for long-term residencies who have highly contributed to the objectives of the programme.



ARD 2020 PIVOTS



PIVOTS stands for Environmental Technology, Innovation, Development and Optimisation Platforms project

The PIVOTS programme started in 2016 and gathered a set of seven experimental and analytical platforms focusing on environmental quality monitoring and sustainable management of natural resources (soil, subsurface, surface water, groundwater, sediment and air) within a context of global change (increased anthropogenic pressure and climate change).

The innovation through PIVOTS based itself on an integrated approach with excellent research by academic and industrial experts together at all stages of the value chain, from fundamental research to validation of products and services.

Activities were aligned alongside the objective to create a cluster of excellence in the field of environmental monitoring in Centre-Val de Loire and to offer scientists and entrepreneurs in this sector the means of experimentation, measurement and testing to carry out their projects.

- **DECAP:** Development of Environmental Sensors and Pollutants Removal Processes
- **PRIME:** Remediation and Innovation in the Service of Environmental Metrology
- **O-ZNS:** Observatory of transport in the Unsaturated Zone
- **PERMECA:** Testing and Research Platform in Collaborative and Applied Environmental Mechanics
- **PESAT:** Soil - Atmosphere exchanges in peat bogs
- **PESAA:** Soil - Atmosphere exchanges in Agricultural soils
- **PRAT:** Atmospheric Reactivity

The project ran under the leadership of the BRGM (French Geological Survey) with teams from the BRGM, University of Orléans, CNRS (National Center for Scientific Research), INRAE (National Research Institute for Agronomy and Environment), Antea Group (consulting and engineering), DREAM (water and environment enterprises cluster) and LE STUDIUM Loire Valley Institute for Advanced Studies.

Between 2016 and 2021, LE STUDIUM recruited five scientists for long-term residencies who have highly contributed to the objectives of the programme.



ARD 2020 LAVOISIER

LAVOISIER stands for LAboratory with a VOcation for Innovation of the Safety and Industrialisation of Renewable Energy.

The central topic of the LAVOISIER Programme revolved around promoting a process of design, research, development and industrialisation of materials and systems oriented towards new energies, including all considerations of reliability and safety of use for the devices studied during all stages of their deployment. This programme has enabled the development of the AlHyance platform.

The CEA (The French Alternative Energies and Atomic Energy Commission) Le Ripault AlHyance platform is dedicated to joint research efforts (Universities, CNRS, industrials) in the field of energy sources that do not emit greenhouse gases, particularly in the hydrogen field (fuels and hydrogen storage cells). Pursued research themes were: design and materials expertise, safety and effectiveness of the systems, synthesis and characterisation, and methods and implementations.

The LAVOISIER programme ran under the leadership of CEA Le Ripault until the end of 2021. It covered activities through research to transfer of technologies with the following goals:

- To gather the conditions to support the energy sources of tomorrow and develop promising innovations of growth by strengthening academic and industrial collaborations.
- To accelerate the industrialisation and the dissemination of innovative new products for low-carbon energy, focusing on the storage of electrical energy and hydrogen.
- To stimulate research on storage of clean and renewable energies (hydrogen, wind and photovoltaic), in order to facilitate their delivery from the place of production to the place of consumption.
- To promote the transfer of technologies/competences to existing businesses at the regional level and beyond.

Research within the framework of this program focused on the storage of hydrogen, storage of electrical energy, energy conversion, fuel cells and the production of hydrogen, development of a new and emerging topic on materials related to solar thermodynamic systems and the mechanical storage of energy. The programme develops a new approach for the design and development of low carbon materials, supported by the analysis of the environmental safety and impact of systems throughout their development stages and life cycles.





MATERIALS & ENERGY SCIENCES

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CONDITIONS EXTRÊMES ET MATÉRIAUX : HAUTE TEMPÉRATURE ET IRRADIATION (CEMTHI) UPR 3079 - CNRS



The laboratory was originally formed in 1969 and renamed the "Centre de Recherche sur les Matériaux à Hautes Températures" in 1998. In 2008, it merged with the "Centre d'Etudes et de Recherches par Irradiation" laboratory. Its goals are to analyse and understand the physical and chemical properties of materials under extreme conditions based on a detailed description of the atomic-scale structures and defects in the solid state or the melt.

CEMTHI has an international level of expertise in chemistry and physics at high temperature and/or under irradiation. Its objectives are the analysis and the understanding of the physicochemical properties of solid and molten materials and their behaviour in extreme conditions of temperature (up to more than 2500°C) and irradiation, from a better description of the local atomic structure and defects in the solid and liquid states. The laboratory has expertise in the fields of high temperatures, fusion and solidification, phase transitions, local order and disorder, meta-stability, in optical, radiative, thermic and electrical properties which are studied in crystalline and amorphous oxides, ceramics, cements and molten salts.



INSTITUT DENIS POISSON (IDP) UPR 7013 - CNRS, UNIVERSITÉ D'ORLÉANS, UNIVERSITÉ DE TOURS



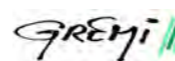
The Institut Denis Poisson (IDP) was created in 2018 on the basis of two laboratories: the Laboratory of Theoretical Physics and Mathematics (LMPTP) based in Tours and the Laboratory of Mathematics (MAPMO) based in Orleans.

The IDP is a multidisciplinary laboratory with mathematicians and theoretical physicists working in a large variety of fields. It is well-known for its high standard works in gravitational physics, quantum field theory, Riemannian geometry and dynamical systems. Several directions of current research pursued in the Laboratory are relevant for the subject of the present project.

The IDP in Tours consists of 42 professors and lecturers and 7 CNRS researchers (4 Chargés de Recherche and 3 Directeurs de Recherche). The administrative and technical support is provided by 3 secretaries, 1 librarian and 2 technicians. It is responsible for teaching within the Master programs «Fundamental physics and applications» (M1), «Non-linear models in Physics» (M2).



GROUPE DE RECHERCHES SUR L'ÉNERGÉTIQUE DES MILIEUX IONISÉS (GREMI) - UMR 7344 - UNIVERSITÉ D'ORLÉANS, CNRS



Created in 1982, the GREMI is a joint University of Orléans/CNRS research unit focusing on plasma and laser processes and their applications in a wide range of fields: energy storage or conversion, materials, micro-electronics, nanotechnologies, metrology, radiation sources, biomedicine, transport, and the environment. About 40 permanent position professors and researchers develop their research with the help of 10 engineers, technicians and administrative staff. The laboratory also welcomes around 30 PhD students and post-docs. The GREMI is one of the major plasma processing laboratories in France and its expertise is internationally recognized in many areas involving plasma properties. Its facilities comprise a substantial experimental infrastructure dedicated both to the production of plasma media and to state-of-the-art plasma diagnostics and routine material analyses. Modeling, strongly linked to experimentation, is also an important aspect of the performed research.



LABORATOIRE DE PHYSICO-CHIMIE DES MATÉRIAUX ET DES ELECTROLYTES POUR L'ÉNERGIE (PCM2E) EA 6299 - UNIVERSITÉ DE TOURS



Located in Tours, the Laboratory of Physics and Chemistry of Materials and Electrolytes for Energy (PCM2E) was created in 2012 and works in the field of energy conversion and storage (batteries, supercapacitors, hybrid photovoltaic, ionic liquids), nanostructured materials and organic electrochromic devices.

About 35 people work within the PCM2E laboratory, including 14 assistant professors, three professors, a professor emeritus and an "Excellence" lecturer. The team has been strongly renewed in the last few years, since nearly half of these members have been recruited since 2007.

The overall project of the laboratory is built around competences in electrochemistry, thermodynamics and chemistry of materials. The laboratory has three priority themes:

- Electrolytes, membranes and electrode materials for energy storage
- Organic semiconductors and nanostructured materials
- Ionic Liquids

In addition to the above-mentioned directions of research, this laboratory is a unique research organisation owing to its in-depth focus on the design and development of novel electrolyte compositions. The electrolyte properties such as ionic conductivity, thermal behaviour, potential range of stability, polarizability and dielectric constant fundamentally impact the performance of all types of batteries and form the core of the research activities.

The beneficial effect of choosing and designing novel materials and compositions of electrolytes and applying them appropriately to different battery systems has been demonstrated through numerous publications and patents at PCM2E.





Prof. Igor Denysenko

LE STUDIUM Research Professor

From: V. N. Karazin Kharkiv National University - Faculty of Physics and Technology - UA

In residence at: Research Group in the Energetics of Ionized Media (GREMI) - Orléans

Nationality: Ukrainian

Programme : SMART LOIRE VALLEY

Dates: January 2021 to March 2021

Prof. Igor Denysenko has been working on low-temperature plasma physics as well as dusty plasma physics and chemistry for more than 25 years. He is an expert of their theoretical and numerical modeling. His recent studies concern the growth of nanoparticles in low-pressure plasmas and its effect on the plasmas. He is particularly well-known for his works related to the effects of nanoparticles on electron energy distribution in complex plasmas and for his studies of the effects of plasma on growth of vertically-aligned carbon nanostructures. In 2003, the Alexander von Humboldt Foundation (Germany) awarded Professor Denysenko a research fellowship. He has been a project leader for a few international projects (Humboldt Foundation projects and a NATO Collaborative Linkage Grant) and many Ukrainian projects. He is co-author of 65 papers, 2 chapters of books, 2 textbooks and many proceedings. He was co-chairman of two international workshops.



Dr Maxime Mikikian

Host Scientist

Dr. Maxime Mikikian has been working on dusty plasma physics and chemistry for more than 20 years and is an expert of their experimental investigation. The background of his recent studies concerns the growth of nanoparticles in low-pressure plasmas and its effect on the plasma. He is particularly well-known for his work related to nanoparticle formation and dynamics and for his discovery of original dusty plasma instabilities. Co-responsible for the topic Functional Materials by Plasmas and Lasers within GREMI, he was the coordinator of the national network on low-temperature plasmas in 2015-2016 («Réseau Plasmas Froids») and is currently in charge of a new CNRS GDR (EMILI) on the same topic. Co-author of 47 papers and about 60 proceedings, he has given 9 invited lectures and 14 talks at international conferences. He has coordinated 6 national or international research projects, and also participated in the organization of 15 national and international conferences and workshops.

MODELING OF REACTIVE PLASMAS FOR NANOPARTICLE SYNTHESIS

The goals of the project are the development of theories and numerical programs to describe physical and chemical processes in reactive (mixtures of argon with acetylene, ethanol or aniline) steady-state and pulsed plasmas, and on walls, substrates and surfaces exposed to these plasmas. These theories and programs are required for analyses of the experimental data of partner-researches from GREMI and for the determination of optimal conditions for the production of nanostructures with desired properties. The activity is carried out to get materials with new advanced properties for different applications and is also of fundamental interest for different fields. During 2019, Igor Denysenko in collaboration with the project partners developed a theoretical model and a numerical program to describe the properties of Ar/C₂H₂ nonstationary plasma with nano- and submicron particles (dust particles). Pulsed regime and plasma with growing nanoparticles were considered. During 2020, the studies of pulsed plasmas with nano- and submicron particles were continued. The properties (densities of electrons and metastable argon atoms, effective electron temperature and dust charge) of argon/dust and pure argon pulsed plasmas were analyzed using a 0D model for different external conditions. The calculated time-dependencies for the densities of electrons and metastable atoms were compared with the experimental measurements and were found to be in a good qualitative agreement. The behavior of nanoparticles in the afterglow period of a pulsed plasma was also studied. To describe the nanoparticle behavior, a 1D theoretical model and a numerical program were developed. That same year, the team also worked on the development of a spatially-averaged model for argon-ethanol plasma. During 2021, the studies on dynamics of nanoparticles in an afterglow plasma were continued. The diffusion model, previously developed in 2020, was essentially improved. It now takes into account the transition from ambipolar to free diffusion in the afterglow plasma. The way external conditions (nanoparticle size, neutral gas pressure and initial electron density) affect the nanoparticle motion was analyzed. The nanoparticle dynamics have been examined in microgravity conditions and in presence of gravity. We also developed a spatially-averaged model for a pulsed plasma containing different sorts of positive ions, negative ions, electrons, nanoparticles and chemically-active species. The model was used to analyze properties of argon-acetylene and argon-aniline plasmas. Using this model, it was found how plasma properties depend on the pulsing frequency. The team also developed theoretical and numerical models to calculate the dust charge distribution function (DCDF) in an afterglow plasma. The calculated DCDFs were compared with the experimentally measured DCDFs in GREMI. The team analysed how metastable-dust collisions affect the DCDF and how the DCDF depends on the shape of the electron energy distribution function. The results of numerical calculations were compared with the experimental measurements and were found to be in a good qualitative agreement.



Prof. Asunción Fernández

LE STUDIUM Visiting Researcher

From: NanoMatMicro / Institute of Materials Science of Seville, Spanish Research Council (CSIC), University of Seville - SP

In residence at: Research Group in the Energetics of Ionized Media (GREMI) - Orléans

Nationality: Spanish

Programme : SMART LOIRE VALLEY

Dates: January 2021 to March 2021

Asunción Fernández graduated in Chemistry at the University of Cádiz (Spain) and carried out her PhD work at the "Max-Planck Institut für Strahlenchemie" obtaining her PhD at the University of Dortmund (Germany) in June 1983. After 4 years post-doc at the University of Seville (Spain), she joined the Materials Science Institute (ICMS) where she is at present full Professor of the CSIC (Spanish Research Council). She leads the research group «Nanostructured Materials and Microstructure» and the Electron microscopy laboratories at the ICMS. Her main research is devoted to the tailored synthesis of nanostructured thin films and nanoparticles and the application of microstructural characterization techniques in the nano-scale. She has been visiting researcher at the Fritz-Haber Institute (Berlin), University of Erlangen-Nürnberg, EMPA-laboratory (ETH Zürich), University of Namur and this year at the GREMI laboratory as a LE STUDIUM Fellow (Orléans).



Dr Anne-Lise Thomann

Host Scientist

Anne-Lise Thomann graduated in material physics at the University of Orléans and carried out her PhD work at the GREMI laboratory on titanium surface nitriding by nanosecond laser induced plasma process. She defended her thesis in June 1995 and obtained her ability to supervise research in 2010. She led the "magnetron sputtering" team for ten years and has been the director of the GREMI laboratory since 2018. Her skills relate to plasma/laser surface interaction, plasma/gas phase diagnostics and surface characterization. She has recognized expertise in deposition of thin films and nanoparticles (metals, oxides) by magnetron sputtering and modification of materials by low pressure plasmas. In 2001 she initiated a research subject on the study of energy transfers during plasma/surface interaction. An original tool had been developed at the GREMI which led to fruitful international collaborations. At present time, her research is mainly focused on magnetron sputtering processes in various regimes for the synthesis of functional deposits for energy conversion or human health.

MAGNETRON SPUTTERING DEPOSITION WITH HE AS PROCESS GAS : UNDERSTANDING THE FORMATION OF NANOSTRUCTURED/NANO-POROUS THIN FILMS

Magnetron sputtering is a widely used plasma-assisted deposition technique for the fabrication of thin films and coatings. The central objective of the project is to investigate the particular case of introducing Helium as a process gas in MS deposition due to the singularity of the He plasma to induce nanoporosity and gas trapped nanobubbles in the growing film. Fabrication, simulation studies and characterization have been carried out in parallel, comparing silicon and aluminium films grown in He and Ar/He plasmas. Two main lines have been undertaken during Asunción Fernández's research stay at the GREMI laboratory: (i) The study of the growing mechanism of nanoporous layers by MS in He plasmas, as well as the formation and stabilization (or not) of He nanobubbles. (ii) The microstructural and chemical characterization of the films prepared with He plasmas using positrons and ion beams assisted (IBA) techniques available at the CEMHTI laboratory in Orléans. Main achievements comprise experimental data by mass spectrometry plasma diagnostic, as well as simulations, on the nature of He plasma in MS deposition conditions. High energy electron population and plasma density, high energy of forming-film atoms and the presence of high energy back-scattered He neutrals at the substrate are playing a role in He trapping and bubbles formation in both Si and Al films. In the case of Al the formation of fuzzy and porous structures was produced in pure He plasma. This result is very relevant for the application of the Al films in hydrogen generation through a hydrothermal hydrolysis reaction route. Important achievements have also been related to the transmission electron microscopy (TEM) and IBA analysis of Si films showing the homogeneous distribution of He nanobubbles in the a-Si films. These results are relevant for the application of the He charged silicon films as solid targets for nuclear reaction studies. Her research stay in January-April 2021 paved the way for a long-term collaboration to the mutual benefit in know-how and expertise of the laboratories in Seville and Orléans. In fact, two more short visits happened in July and November 2021. Main recent achievements are related to the investigation by IBA analysis of the helium release process during annealing in vacuum. This research is relevant to investigating the stability of trapped He for the films application as targets for nuclear reaction studies. Films of different metals as Co and Zr are also being prepared by He plasma MS in addition to Si and Al. The preparation of two new joint publications is envisaged.

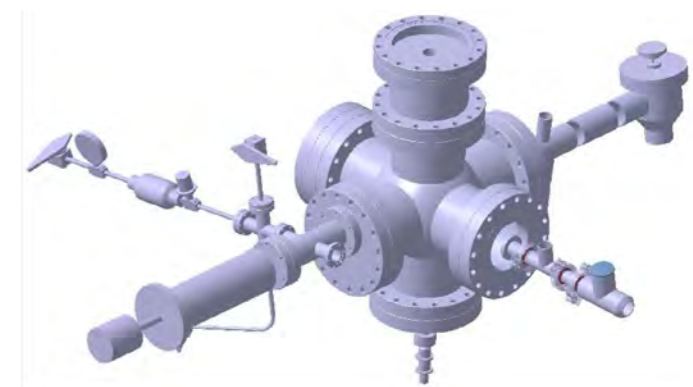


Fig. 1.- Magnetron sputtering deposition chamber to work with Helium as process gas



Dr Arunabh Ghosh

LE STUDIUM Research Fellow

From: Tata Steel Advanced Materials Research Centre - IN

In residence at: Physical Chemistry of Materials and Electrolytes for Energy (PCM2E) - Tours

Nationality: Indian

Programme : ARD 2020 LAVOISIER

Dates: February 2019 to January 2021

Dr Arunabh Ghosh obtained his PhD from the SKKU Advanced Institute of Nanotechnology, Sungkyunkwan University, South Korea in July 2013. He holds an M.Sc. in physics from IIT Kanpur, India (2008). After his PhD, he worked as a Senior Research Fellow at the National University of Singapore (From Aug 2013). In February 2018, he joined Tata Steel Advanced Materials Research Centre, India, and worked as an Application Engineer (senior manager), before starting his current position at LE STUDIUM Loire Valley Institute for Advanced Studies (from Feb 2019). Here he worked in collaboration with the PCM2E laboratory of the University of Tours. His research interest is focused on the development of nanomaterials and electrolytes for supercapacitors and batteries. He has worked extensively on translational research, and industry-academia collaborations. He has been involved in several industrial projects with companies like Nippon, Murata, Hoshen Corp., Tata Motors and others. He has a strong interest in performance-cost modeling of battery packs for electric vehicle applications, and he is actively involved in real-life projects.



Dr Fouad Ghamouss

Host Scientist

Professor Fouad Ghamouss is an associate professor at the PCM2E Lab in the University of Tours. He is involved in several activities within the general area of electrochemical storage. He currently has a sub-grouping of ca 12 Master's theses, PhD students and postdocs and takes parts in several national and international projects, especially for Li-ion batteries and supercapacitors. He is co-author of more than 80 peer-reviewed articles, patents, conference proceedings, and reports in the field of electrochemical storage. Fouad Ghamouss has supervised 14 PhD theses and more than 30 master's students in electrochemistry, material sciences, and electrochemical storage. His main interest is the development and the study of advanced electrolytes and electrodes materials for Li-ion batteries and beyond Li-ion as well as supercapacitors.

DESIGN, FORMULATION AND CHARACTERISATION OF NEW SAFER ELECTROLYTES FOR ELECTROCHEMICAL STORAGE OF ENERGY

The goal of this research project is to develop a new electrolyte composition, which is much safer compared to the commercially available benchmark for supercapacitive energy storage applications. This new electrolyte would be capable of working in ultra-low temperatures.

Beyond having a large potential window and high ionic conductivity, there are many other requirements, such as electrochemical stability, high ionic conductivity, suitable viscosity, which an electrolyte needs to meet in order to be promising for the performance of the device. Beside these, the electrolyte must have a large liquid range temperature, which is the main deciding factor of the device's operating temperature range. Furthermore, the volatility and flammability of the electrolyte are the keys to deciding the safety grades of supercapacitor devices.

In this context, the team have formulated and designed a new set of electrolytes, one is based on a new organic solvent, and the other one is based on a mixture of two ionic liquids. The target is to fulfil application needs in sub-ambient temperatures, presenting good mobility, low flammability and wide working potential window.

The new organic solvent-based electrolytes exhibited higher potential window stability up to 3 V; also, it is noteworthy that this 3 V potential window was obtained using symmetric supercapacitor configuration only. Besides, each optimized electrolyte has shown significantly improved fire safety compared to commercially available ACN-based electrolytes, which is reflected by significantly higher flash points compared to those that are ACN-based. In addition, they have demonstrated that each selected new electrolyte is capable of low-temperature supercapacitor operations. On the other hand, the second type of developed electrolyte was used in conjugation with vertically aligned carbon nanotube (VCNTs) based electrodes for supercapacitor applications, and they have demonstrated ultra-low temperature operations, along with higher safety compared to any commercially available electrolytes.

In both cases, the team has finished all detailed characterizations, like determination of conductivities, viscosities, flash points, and obtained detailed electrochemical performances.

In order to obtain even stronger scientific conclusions, they have performed further works, including theoretical calculations and some other experimental characterizations. The team supported key structural descriptors by density functional theory and COnductor-like Screening Model for Real Solvents (COSMO-RS) calculations, which was associated to the physical and electrochemical properties of the resultant electrolytes.

In parallel, the second work based on VCNTs was continued. They continued testing supercapacitor devices in a wide temperature range (- 40°C to 60°C) with both the commercially available ACN based electrolyte, as well as with the ionic liquid mixtures. Here, they have introduced a set of VACNT electrodes which were of different heights, and of different compositions. The compositional variations were introduced by the relative amount of amorphous carbon contents within the VCNT electrodes. At least 8 different types of compositions were used and corresponding supercapacitor devices were fabricated and thereafter tested using commercial electrolyte and in the above temperature ranges. Multiple cells were fabricated to ensure reproducibility of the system.

Two review articles were written, based on the current scientific developments and related trends on different electrolytes for battery applications.



Mr Abdullah Khan

LE STUDIUM Visiting Artist

In residence at: Extreme Conditions and Materials: High Temperature and Irradiation (CEMHTI) - Orléans

Nationality: Indian

Programme : SMART LOIRE VALLEY

Dates: September 2021 to October 2021

First drawn to painting after being inspired by Cubism's proposal of perceiving the physical, Abdullah Khan creates paintings that play on human vision and perception. His practice focuses keenly on the intersection of abstraction and representation, subconscious and conscious, art and technology. Trained as a mechanical engineer, his research into materials sciences and industrial design eventually led to art as a profession and vocation.

Any number of subjects from his arcane interests as well as his own contemplations of changing self and observations of the current zeitgeist inspire his work. His style is informed by technological precision and analog draughtsmanship with visible readings from cubism, minimalism, the colour theorists, the abstract expressionists, although the diversity of subject matter defy any single classification.



Dr Lavinia Balan

Host Scientist

Lavinia Balan obtained her PhD degree from the University Henry Poincaré in Nancy, France, in 2005. Her PhD was devoted to the elaboration of an original material for the anode of Li-ion batteries. After a post doctorate in Orléans and then in Mulhouse, she joined the Department of Photochemistry (DPG) of Mulhouse in 2006 as a CNRS Senior Researcher. She opened a new field of research in this laboratory, viz. the photoassisted synthesis of metal nanoparticles and metal-polymer nanocomposite materials. L. Balan joined the Institute of Materials Science of Mulhouse (IS2M) CNRS-UMR 7361 in December 2009. She has published more than 100 papers, 4 book chapters and 5 patents. Dr. L. Balan has been serving as an editorial board member for a few scientific journals.

ART & SCIENCE: A SYNTHESIS

At CEMHTI, Abdullah Khan worked in collaboration with Lavinia Balan to realise artworks based on her work on metallic nano-particles, specifically silver. The usage of Lavinia Balan's process in Abdullah's work is a key bridge between the cutting edge of material sciences with new artistic forms inspired by the aesthetics of the sciences themselves, which could then inspire new ways to visualise or explore new avenues in scientific thought. The works during his residence investigated the relationship of science and art, and how their nebulous nature being vastly different, have certain commonalities, one could say complementary, each providing what the other lacks. His research on materials for creative works and his search for greater reflectivity lead him to the research of Lavinia Balan, whose excellent work at the CEHMTI, CNRS, France seemed to perfectly summarise his particular problem and provide the perfectly elegant solution: a silver deposition process of a photosensitive polymer matrix using UV light, a novel innovative technique of silvering glass and many other relevant materials such as canvas and textile whilst retaining high reflectance and flexibility with the medium. This process offers not only a completely environmentally safe process, but also a host of other benefits specific to the creation of artworks such as room temperature application, self healing properties, a quick drying time, ability to use with layers to protect from oxidation, as well as scope for a wide range of reflectance by varying the duration, intensity and focus pattern of UV light as well as by varying the concentration of metal precursor in the photosensitive solution. This has allowed silvering to be performed by hand in partial deposition, and in multiple layers of varying reflectance, allowing controlled transparency and reflectivity.





Dr Georgios Nikiforidis

LE STUDIUM Research Fellow

From: King Abdullah University of Science and Technology (KAUST) - SA

In residence at: Physical Chemistry of Materials and Electrolytes for Energy (PCM2E) - Tours

Nationality: Greek

Programme : ARD 2020 LAVOISIER

Dates: January 2020 to January 2021

Dr. Georgios Nikiforidis is an accomplished researcher with a particular focus on materials science and electrochemical energy storage systems. His area of scientific interest lies in exploring the properties of novel materials and electrolytes on energy storage devices for fundamental understanding and direct application in the industry. Throughout his academic and professional career, he systematically studied various electrochemical energy storage and generating devices, spanning from redox flow batteries, photo-assisted flow cells, aqueous and non-aqueous metal batteries, supercapacitors, biofuel cells to organic electrochemical transistors. This has led him to 33 publications, 22 of which he is the main or co-author and one book chapter. He has demonstrated the ability to adapt to new environments, work with diverse teams, and effectively communicate with people of different backgrounds. His credentials also include setting up and maintaining the functionality of laboratories, writing and managing research projects, and mentoring undergraduate and postgraduate students.



Prof. Mérièm Anouti

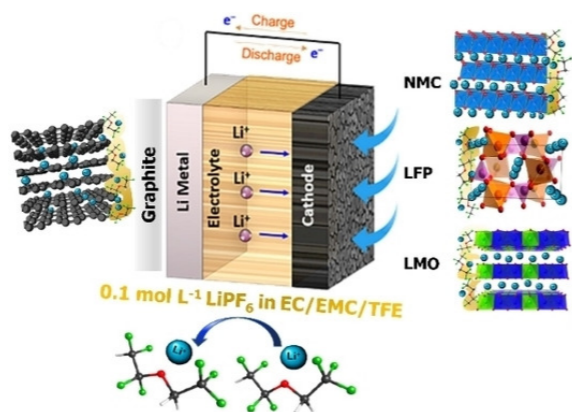
Host Scientist

Prof. Mérièm Anouti is a Professor in the PCM2E laboratory at the University of Tours. Her research focuses on electrolytes for electrochemical energy storage with a particular emphasis on room temperature molten salts as ionic liquids, deep eutectic solvents and their mixtures. She also applies ionic liquids for nanomaterials synthesis and studies fundamental properties including dissolution of gases. Based on the use of ionic liquids, she formulates electrolytes for improving the lifetime of energy storage systems, especially by enhancing the voltage and operating temperature range and by controlling the phenomena at the electrode/electrolyte interface. She coordinates numerous ANR, regional funded and industrial research projects while also supervising PhD students. Her industrial research includes contracting with national and multinational companies.

A HIGHLY CONCENTRATED VANADIUM PROTIC IONIC LIQUID ELECTROLYTE FOR THE VANADIUM REDOX FLOW BATTERY

Since the volumetric capacity in a Redox Flow Battery (RFB) is directly related to the soluble redox species, it is essential to boost the anolyte and catholyte concentration to improve the energy density. The nature of the solvent introduced in the battery determines the solubility and stability of the numerous vanadium species of the solution. Ergo, ionic liquids (ILs), either pure or mixed with other solvents, are a promising alternative to aqueous electrolytes. ILs are organic salts composed entirely of ions and possess a low melting point (<100 °C). Protic Ionic Liquids (PILs) are formed by proton transfer from a Brønsted acid to a Brønsted base and represent the protic subgroup of ILs. The critical properties of PILs lie in their ionic conductivity and supercooling character, allowing them to be liquid over a wide temperature window. The goal of this study was to delineate protic ionic liquids (PILs) as solvents for high energy density redox flow battery systems.

Despite being less conductive than standard aqueous electrolytes, PILs are thermally and chemically stable and equally dense as typical aqueous solvents. Most importantly, Dr. Nikiforidis' team found that the IL containing 20% mass of pyrrolidinium can solubilize 6 mol L⁻¹ of vanadyl sulfate, thus increasing the Vanadium RFB energy density by a factor of 2.5 (i.e., reaching a theoretical energy density of 122 Wh L⁻¹). To this end, they report a VRFB that uses for the first time aqueous electrolytic mixtures based on protic ionic liquids. The physicochemical characteristics of the PIL(aq)/vanadium electrolyte are defined throughout a wide operating temperature range (i.e., -20 to 80 °C) and found to be stable for several weeks. Electrochemical measurements reveal comparable quasi-reversible kinetics to those observed in standard sulfuric acid electrolytes. A proof-of-concept vanadium redox flow (VRFB) cell with a PIL electrolyte was reported for the first time at 25 and 45 °C, showing comparable thermal stability and performance to that of the conventional aqueous electrolyte. The cell yielded acceptable energy and coulombic efficiencies of the order of 65% and 93%, respectively, a nominal capacity of 1250 mAh at current densities up to 60 mA cm⁻² along with moderate cyclability (i.e., 150 cycles combined). The results gleaned from this study provide a platform and serve as a benchmark for the development of new generation VRFBs and, at the same time, pave the way to utilize PILs in other redox couples such as cerium [Ce(III)/Ce(IV)] and bromine [Br₂/Br⁻].



Dr Laura Piveteau

LE STUDIUM Guest Research Fellow

From: Department of Chemistry and Applied Biosciences, ETH Zurich - CH

In residence at: Extreme Conditions and Materials: High Temperature and Irradiation (CEMHTI) - Orléans

Nationality: Swiss

Programme : ARD 2020 LAVOISIER

Dates: September 2019 to June 2021

Laura Piveteau completed her bachelor and Master studies in chemistry at ETH Zurich (Switzerland) and earned her doctoral degree at the same institution in the group of Maksym V. Kovalenko. Her doctoral studies were supported by the Fund of the Swiss Chemical Industry (SSCI) with a Scholarship. She was awarded the ETH medal for her doctoral thesis and her research revolved around developing, adapting and applying nuclear magnetic resonance (NMR) spectroscopy to colloidal semiconductor nanocrystals and perovskite materials. She conducted her postdoc at the CEMHTI laboratory at CNRS Orléans, where she developed NMR techniques to visualize structures and order in the intermediate range under the supervision of Dominique Massiot. Her postdoctoral studies were rendered possible by an Early Postdoc Mobility fellowship financed by the Swiss National Science Foundation (SNSF). She is now employed as a solid-state NMR expert at the NMR platform of the Institute of Chemical Sciences and Engineering at EPFL.



Dr Dominique Massiot

Host Scientist

Dominique Massiot is the Directeur de Recherche [CNRS] at the CEMHTI laboratory with an interdisciplinary scientific profile mostly focused on materials sciences and advanced developments of nuclear magnetic resonance spectroscopy. Dominique Massiot has published more than 270 articles receiving more than 13000 citations. He has mentored more than 20 theses, and has been the coordinator of industrial and European contracts. Among other awards, he received the Silver Medal of CNRS (2003), the médaille Berthelot of the French Academy of Sciences (2013), and was received as Docteur Honorifique de l'Université d'Ottawa (2018). He created the CEMHTI laboratory in 2008, was the founding director of the IR-RMNTHC national infrastructure, and was the Director of the Chemistry Department at the CNRS headquarters in Paris- France from 2013 to 2017. He is currently one of the four editors of Progress in Nuclear Magnetic Resonance Spectroscopy and a member of the "Haut Conseil des Infrastructures de Recherche" at the French Ministry of Science, Paris.

NMR STUDY OF DISORDERED INORGANIC MATERIALS USING SPIN DIFFUSION

The goal of this research project is to obtain a better understanding of chemical, geometrical and topological order in complex, disordered inorganic materials. Building on the atomic or molecular scale resolution obtained from state-of-the-art nuclear magnetic resonance (NMR) experiments (e.g. single pulse, double or multiple quantum selection), the team wants to develop solid-state NMR experiments based on spin diffusion, a spontaneously occurring spin-polarization transfer process, to extend the accessible spatial distance between nuclei to be correlated and thus characterize inorganic solids at the nanoscale. NMR is a method of choice to study amorphous and disordered materials. Spin diffusion has proven to be very powerful to characterize organic polymers and protein structures revealing short and middle range structural characteristics in the size range of several Angstroms up to a few nanometres, which is not or poorly accessible by other analytical methods. However, proton-free inorganic samples exhibit only very inefficient spin diffusion, which has been seldom observed or eventually becomes unobservable when the dipolar interactions are averaged out by magic angle spinning. Nevertheless, a recent publication by the Emsley group (Björgvinsdóttir et al. J. Am. Chem. Soc. 2018, 140, 7946-7951), taking benefit of surface enhanced dynamic nuclear polarization (DNP), reports efficient spin diffusion in proton-free inorganic solids from surface to the bulk. This finding prompts the prospect to be able to develop solid-state NMR experiments to observe spin diffusion in inorganic materials and to study their structural, compositional and morphological properties at larger spatial scales than previously possible. The team started their study with phosphate materials exploiting the ease to record 31P NMR spectra thanks to the high natural abundance and sensitivity of this nucleus. In proton-free phosphate crystals with known structure, they could observe and investigate natural spin diffusion occurring at the time-scales of several seconds. They attempted to accelerate the spin diffusion process as it is the time-limiting step of the experiment. They achieved this by active reintroduction of dipolar interactions through radio-frequency driven recoupling (rfdr), thus obtaining complete polarization transfer after less than 100 ms. By careful experimental design and basic simulations, the polarization transfer mechanisms and the pathways from one nucleus to another could be traced and understood. Complexity was increased by switching to PbO-P2O5 glasses of various compositions, where phosphorous holds the role of a network former. Since individual chemical species are not resolved anymore in the 31P NMR spectra of such disordered materials, selective experiments must be used. Multi-quantum filters followed by rfdr-driven spin diffusion are a possible approach to obtain spectra within reasonable time. However, their interpretation, which is already complex without spin diffusion, requires the development of analysis tools, which is still on-going work. Furthermore, in these multi-quantum experiments they also observed signals which were considered in the past to be artefacts, since they undesirably passed the multi-quantum filter. But, since they originate from a cross-term between the dipole-dipole interaction and the anisotropic chemical shift, these signals are indicative for the proximity of molecular units and thus represent an alternative approach to learn more about mid-range order inside disordered inorganic materials, hence, another approach we follow within this project.



Dr Edurne Serrano-Larrea

LE STUDIUM Research Fellow

From: University of the Basque Country - ES

In residence at: Extreme Conditions and Materials: High Temperature and Irradiation (CEMHTI) - Orléans

Nationality: Spanish

Programme : ARD 2020 LAVOISIER

Dates: September 2019 to December 2020

Edurne Serrano-Larrea received her PhD in Chemistry by the University of the Basque Country in 2009. Her thesis focused on the search of open inorganic-organic compounds based on the vanadate oxoanion, involving crystal structure resolution and analysis, and the study of their thermal, spectroscopic and magnetic properties. She has specialized on the study of the catalytic properties of inorganic-organic materials. During her postdoctoral trajectory, she has focused on the obtention and study of porous crystal frameworks with open metal sites for enhanced catalytic activity. She has participated in the International Network on Ionic Liquid Deep Eutectic Solvent Based Metal Organic Frameworks Mixed Matrix Membranes MSCA-RISE (N° 778412) whose aim is to develop new advanced water remediation filters for heavy metals removal. She is coauthor of 32 scientific articles and 2 book chapters.



Dr Conchi Ania
Host Scientist

Conchi Ania received her PhD in 2003 from the University of Oviedo (Spain). In 2009 she became a Tenured Scientist at the Agencia Estatal CSIC, and in 2017 she joined the CNRS as Director of Research. She has been a grantee of the European Research Council since 2016 and is an editor of Carbon journal (Elsevier). She has a long-standing interest on nanoporous materials with tailored surface chemistry and architectures for energy storage & conversion, wastewater treatment, gas adsorption & separation. She has an H-index of 43 with over 6000 citations.



Dr Encarnacion Raymundo-Piñero
Host Scientist

Encarnacion Raymundo-Piñero got her PhD in 2002 at the University of Alicante (Spain), and joined the CNRS in 2006. She is currently Director of Research at CEMHTI. Her research interests are the electrochemical applications of nanoporous materials (supercapacitors, batteries) and the removal of pollutants. She is the inventor of 13 patents in electrode materials for electrochemical applications. She has an H index of 39, with over 8000 citations.

CHALLENGES AND OPPORTUNITIES IN MATERIALS FOR GREEN ENERGY PRODUCTION AND CONVERSION

The main objective of this conference was to gather international and national experts in the field of materials science whose works contribute to electrochemical and photoelectrochemical approaches for clean energy production and conversion. In addition, the event was thought to be a platform to put in touch researchers with the same interests in order to favor new collaborations.

During the conference, 18 plenary and oral communications took place covering the main topics of the conference: Solar-driven energy conversion (solar fuels), Photoelectrochemical water splitting, Green processes for H₂ production, Fuel cells for the electrochemical reaction of H₂ and O₂, Photocatalytic and electrocatalytic CO₂ reduction processes, and Photoelectrocatalytic reactors for energy conversion.

The conference ended by a Round Table session for discussion among all the participants, aiming to exchange about the status quo of the field of green energy production and conversion technologies in Europe and at the international scale, also aiming to seek the possibility to establish collaborations to make joint contributions for the advance of the field.

A total of 60 attendees from 13 countries (from Europe and beyond) enjoyed the communications and participated in the question rounds. Internationally renowned scientist experts in Materials Science and Chemical Engineering from the international scientific scene participated in the conference. Researchers from France, Spain, Portugal, Greece, Italy, Chile, Sweden and Norway gathered in the conference and shared their last research achievements. The Round Table of discussion accounted for the vision of highly internationally recognized scientists in the field.



LE STUDIUM CONFERENCES



Dr Corneliu Sergiu Stan

LE STUDIUM Research Fellow

From: Gheorghe Asachi Technical University of Iași - RO

In residence at: Extreme Conditions and Materials: High Temperature and Irradiation (CEMHTI) - Orléans

Nationality: Romanian

Programme : SMART LOIRE VALLEY

Dates: November 2021 to October 2022

Corneliu S. Stan defended his doctoral thesis "New lanthanide complexes with organic ligands" in 2012 and is currently a full-time researcher within the Natural and Synthetic Polymers Department within the Faculty of Chemistry of the Gheorghe Asachi Technical University of Iasi, Romania. During the last 10 years he has published 40 research papers (32 in peer reviewed high impact ISI Journals), mostly as main author, achieving more than 260 citations. Also, he is the main author of 6 national patents, 3 national registered patent requests, and 1 international patent request. His main research areas of interest are nanostructured carbon dots with optical and medical applications, luminescent materials, lanthanide and transition metals complexes including polymer complexes, aerogels, polymer composites etc. He was involved as main researcher in the successful completion of more than 6 national funded, multi-annual research projects.

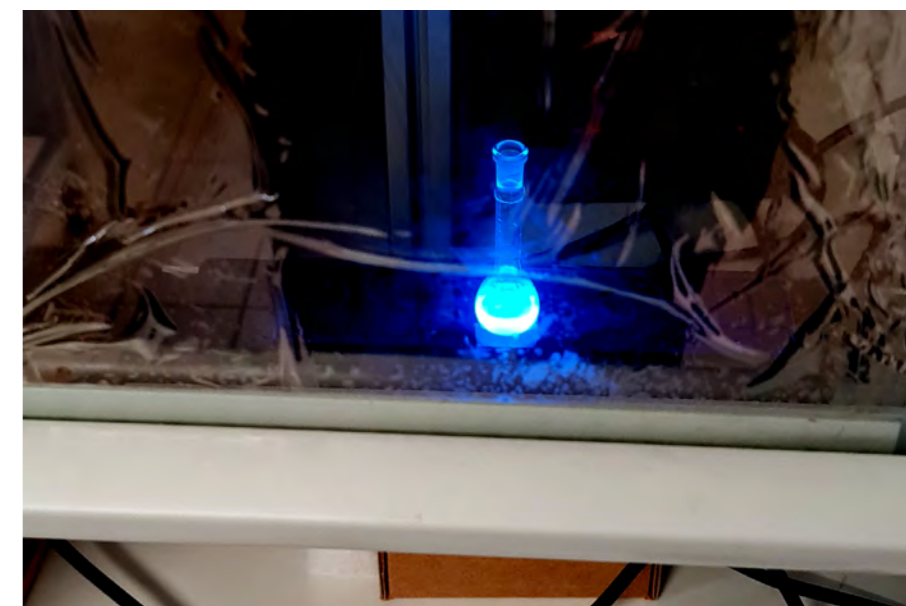


Dr Conchi Ania
Host Scientist

Conchi Ania received her PhD in 2003 from the University of Oviedo (Spain). In 2009, she became a Tenured Scientist at the Agencia Estatal CSIC, and in 2017 she joined the CNRS as Director of Research. She has been a grantee of the European Research Council since 2016 and editor of Carbon journal. She is a highly recognized researcher in the field of carbon materials and their photochemistry. She has an ample background and wide experience on the design of nanoporous materials with modulated properties for applications as electrodes, catalysts and adsorbents and their integration in high-tech environmental remediation and energy conversion/storage. She has an H-index of 43 with over 6000 citations. She has a large experience on coordinating and participating in R&D projects and industrial contracts, currently holding an ERC-Consolidator Grant of the H2020 program- on photochemistry of carbon materials for technological applications.

CARBON NANOMATERIALS AS SOLAR UV PROTECTORS TARGETING APPLICATIONS RANGING FROM PAINTS/VARNISHES TO PHARMA/COSMETIC PRODUCTS

The main goal of the project, started on 1st November 2021, is the development of new nanostructured carbon dots and their application as solar UV protectors in various materials, ranging from paints/varnishes for automotive/household to pharmaceutical/cosmetic products and formulations. This novel approach is supported by the hypothesis that protection can be provided by the down conversion of the harmful solar UV towards lower energy photons produced through the radiative processes within highly photoemissive Carbon Dots, thus reducing the negative effects over long term solar exposure. Corneliu Stan's work focused on imide-derived Carbon Dots suggests that they are particularly well suited for this goal due to the wide range UV excitation of their radiative processes, along with high physico-chemical stability, inertness, non-toxicity and ease of fabrication with minimal environmental impact. Their excitation interval is located conveniently in the 300–390 nm range covering both UV-B and UV-A regions, where most of the solar UV component at sea level is located while the photons produced by PL emission are located in the blue-green area of the visible spectrum, which are markedly less harmful for the surfaces intended to be protected. To date, the research activities have been focused on experimental work in order to improve/adapt the N-Hydroxyphthalimide (NHF) derived Carbon Dots to the intended goal. Carbon Dots doped with Cu(III), Co(III), Zr(IV) and Fe(III) were obtained through thermal processing through partial pyrolysis under controlled parameters (temperature, thermal exposure time of the precursors etc) of the ante-prepared NHF complexes with above mentioned cations. These NHF complexes with above mentioned cations were respectively prepared at 1/2 and 1/4 metal to ligand ratio. Currently, the prepared nanomaterials and NHF complexes precursors are under structural investigation. Another aspect which is currently under investigation is the determination of the Carbon Dots content within the aqueous dispersion resulted after the preparation. As the conventional methods are not suitable (at least for the small quantities prepared at the lab scale) or not expected to provide accurate measurements, a new method was taken into consideration, which uses a QCM equipment (Quartz Crystal Microbalance). The measurement protocol was adapted to the prepared aqueous dispersions of Carbon Dots and, within the QCM methods constraints, is currently under experimental investigation; so far the results are very promising. Also, a series of polymer matrices were prepared to be loaded with the above-mentioned photoluminescent Carbon Dots in order to evaluate the effects of the long term exposure to UV-C radiation.



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Prof. Igor Denysenko

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- Denysenko, I. B.; Mikikian, M.; Azarenkov, N. A. Dust dynamics during the plasma afterglow, *Journal of Physics D: Applied Physics*, accepted, 2021, <https://doi.org/10.1088/1361-6463/ac3539>

Dr Asunción Fernández

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Dr Arunabh Ghosh

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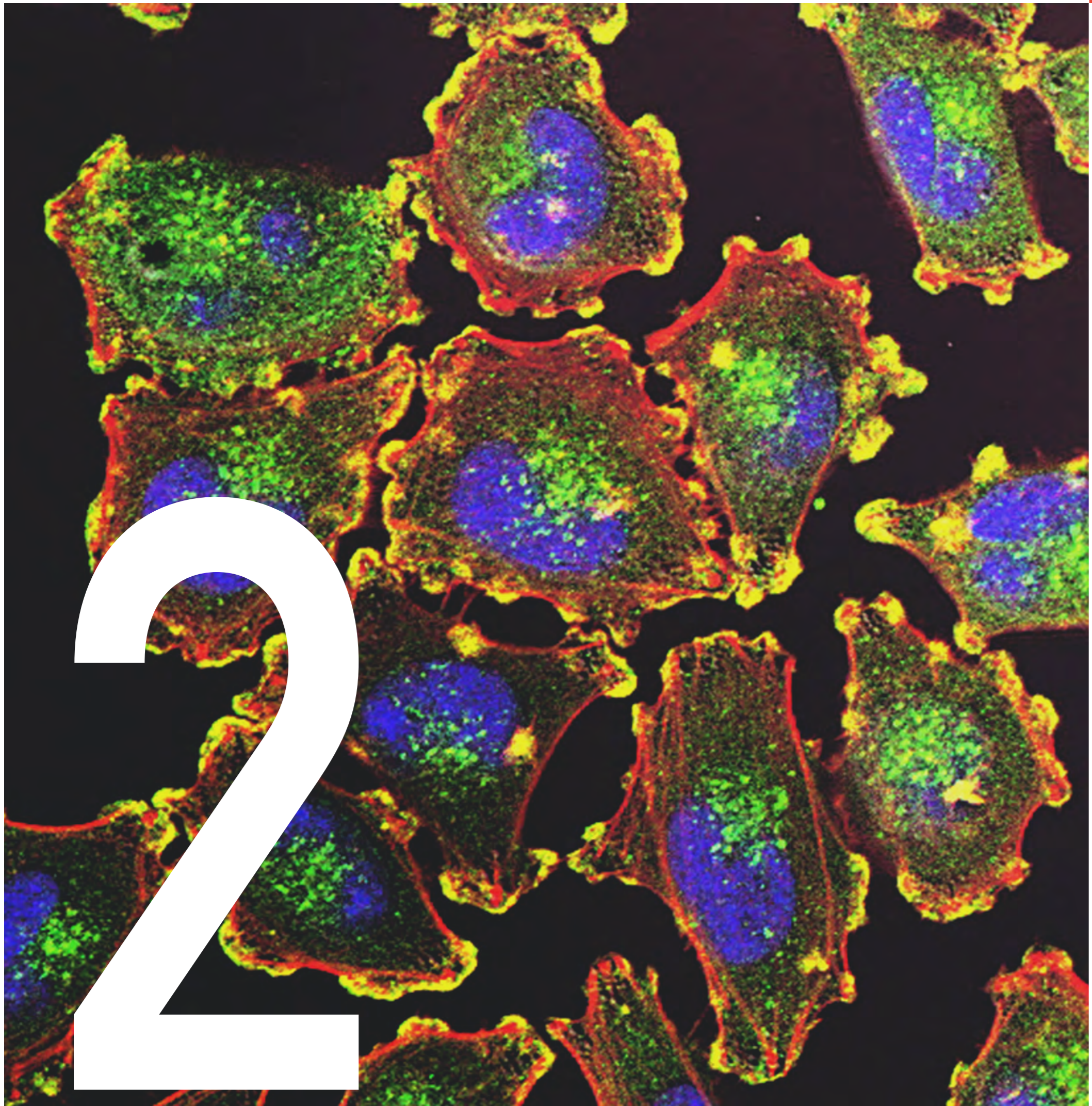
Dr Georgios Nikiforidis

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Dr Laura Piveteau

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LIFE & HEALTH SCIENCES

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BIOMOLÉCULES ET BIOTECHNOLOGIES VÉGÉTALES (BBV)

EA 2106 - UNIVERSITÉ DE TOURS



The Plant Biomolecules and Biotechnology laboratory was founded in 1987 and is located at the Faculty of Pharmacy in Tours. This Laboratory is mainly dedicated to the characterization of plant-specialized metabolisms and their use as pharmaceuticals, cosmeceuticals and biopesticides, with the use of combinatory approaches in plant physiology, molecular biology, biochemistry, bioinformatics (identification of genes), genetics and metabolomics. The laboratory is also involved in the development of plant biotechnologies (in vitro technologies and GMOs) and in bio engineering (production of plant metabolites in yeast). This laboratory also works on applied research programs to identify new natural preservatives or biologically active ingredients (BAIs) for cosmetics.



CENTRE D'ÉTUDE DES PATHOLOGIES RESPIRATOIRES (CEPR)

UMR 1100 - INSERM, UNIVERSITÉ DE TOURS



The INSERM UMR-618 unit «Proteases and Pulmonary Vectorizations» created in 2002 by Prof. F. Gauthier in Tours became the «Research Center for Respiratory Diseases (CEPR)» in 2017 and has since been headed by Dr M. Si-Tahar. Respiratory diseases have a major impact in medical and socio-economic terms. CEPR develops a continuum of research from the understanding of mechanisms of lung infection and inflammation up to the validation of novel therapeutic strategies. CEPR gathers chemists, biochemists, immunologists, microbiologists, cell biology experts and physicians, all experts in the study of respiratory diseases.



IMAGERIE ET CERVEAU (IBRAIN)

UMR 1253 - UNIVERSITÉ DE TOURS, INSERM



The University of Tours Imaging and Brain Unit was created in 1988 with the goal of generating a local network of specialists in different domains in neuroscience. The unit is located at the school of medicine and the University Hospital where medicine students, faculty professors and research scientists come together to exchange scientific ideas in neuroscience. The main objectives of the unit is to improve the understanding of psychiatric and neurologic disorders and to develop new imaging technologies and innovative therapies for the diagnosis and treatment of neuropathological disorders. The host laboratory (Dr. Patrick Vourc'h), Team 2 "Neurogenomics and neuronal physiopathology" is a member of the iBrain unit and his research is mainly focused on developing therapies for the treatment of Amyotrophic lateral sclerosis (ALS). Team 2 is a multidisciplinary team of neurologists, geneticists, biochemists, and molecular biologists that are working together on taking research data from the laboratory into the clinic that can benefit patients in the long run.



INSTITUT DE RECHERCHE SUR LA BIOLOGIE DE L'INSECTE (IRBI)

UMR 7261 - CNRS, UNIVERSITÉ DE TOURS



The Insect Biology Research Institute (IRBI) is dedicated to the analysis of interactions between insects and their biotic and abiotic environment. IRBI is a joint research unit of the University of Tours and the CNRS (UMR 7261). Bringing together researchers and lecturers from different disciplines (e.g. ecology, physiology, genetics, (bio)chemistry, physics, bioinformatics and mathematics), IRBI represents a rare place with an asserted international identity on insect sciences. To understand the puzzle of life and to confront the complexity of biological systems, their functioning and their evolution, IRBI integrates approaches at the interface between organismal biology, ecology and evolutionary biology. The areas of transfer range from biological control for sustainable agriculture to the development of new technologies for the control of vector and invasive insects in urban and natural environments, as well as biomimicry or the production of insects for feed and food.



INFECTIOLOGIE ANIMALE ET SANTÉ PUBLIQUE (ISP)

UMR 1282 - CENTRE INRAE VAL DE LOIRE, UNIVERSITÉ DE
TOURS



The Multi-resistance and Pathogenicity of Nematodes team (MPN) belongs to the Infectiology and Public Health Unit (ISP, UMR 1282). The main aim of the MPN team is the sustainable control of gastro-intestinal parasitic nematodes (GIN) in livestock. Currently, the control of GIN infections remains largely based on anthelmintic treatments, but increasing anthelmintic resistance has reduced their efficacy. In that respect, during the past decade, the group has investigated anthelmintic resistance on several different aspects from field studies to molecular characterization of parasite anthelmintic targets and new drug target discovery. The range of expertise of the team includes: molecular ecology, mathematical modelling, biochemistry and cellular and molecular biology. They have participated in numerous international projects dealing with anthelmintic resistance.



LABORATOIRE DE BIOLOGIE DES LIGNEUX ET DES GRANDES CULTURES (LBLGCG)

UNIVERSITÉ D'ORLÉANS, INRAE



Founded in 1996, the «Plant Lignans» laboratory works in the fields of plant physiology, molecular biology (gene function), biochemistry (biosynthesis of molecules through the plant), analytical chemistry and in vitro culture applied to the study of phenylpropanoid-derived products. The team also works on applied research programs to find new natural preservatives and active ingredients for cosmetic applications. More recently, the team started to work on the green extraction of plant bioactive compounds with cosmetic/pharmaceutic interest, using natural deep eutectic solvents (aka NaDES). In the framework of the PIERIC project (ARD CosmétoSciences), the present work is therefore of special interest for this latter aspect of the research developed in the laboratory





Dr Maria-Cristina Del Rincon-Castro

LE STUDIUM / Marie Skłodowska-Curie Research Fellow

From: University of Guanajuato - MX

In residence at: Insect Biology Research Institute (IRBI) - Tours

Nationality: Mexican

Programme : SMART LOIRE VALLEY

Dates: Octobre 2020 to Octobre 2021

María Cristina Del Rincón-Castro is currently a professor and was head of the Doctoral School in Biosciences in the Department of Food, at the University of Guanajuato in Mexico. She obtained her Ph.D. in Plant Biotechnology at CINVESTAV-IPN Irapuato in Mexico. She is a member of the National System of Level 2 Researchers and of the National Academy of Sciences; she was President of the Mexican Society of Biological Control. She has been focusing her research on the characterization, identification, molecular biology, and evaluation of entomopathogenic viruses as biological control agents of pests and as expression vectors of eukaryotic genes for 30 years. She has published more than 50 research articles in international journals, 10 book chapters, and made 115 presentations to experts in biological control at national and international meetings. She has been responsible for 16 research grants related to biological control agents for pests of economically important insects in México.



Dr Elisabeth Herniou
Host Scientist

Elisabeth Herniou is a CNRS Research Director at the Insect Biology Research Institute UMR 7261 CNRS – University of Tours. She obtained her PhD from Imperial College London in the UK and was among the first ERC awardees to settle in the Centre-Val de Loire region. She has published over 60 publications, and serves as editor for the Journal of General Virology and Virus Evolution. She was awarded the founder's lecture prize for her scientific contribution to the Society for Invertebrate Pathology. Anchored in evolutionary biology, her research focuses on the interactions between genomes and ecology in the context of host-pathogen interactions, in particular between insects and viruses. Her multidisciplinary approach integrates different levels of complexity to understand how ecology shapes genomes and can thus lead to speciation. Her concern for societal issues has recently led her to undertake forest biodiversity studies in the context of global change and to study pathogens in connection with the developing field of Insect for Food and Feed with the European project Insect Doctors.

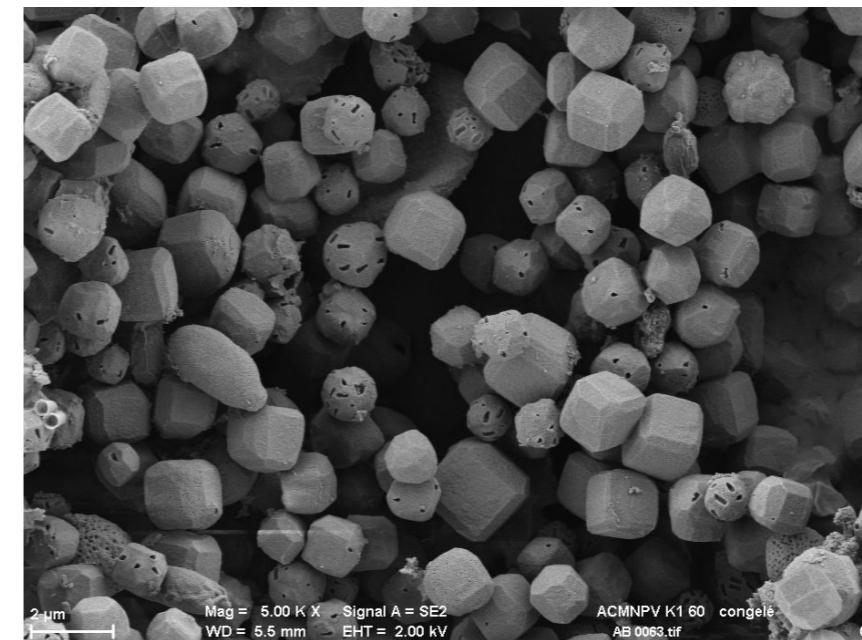
GENOMIC CHARACTERISATION OF SIX MEXICAN BACULOVIRUS STRAINS WITH ACTIVITY AGAINST SPODOPTERA FRUGIPERDA (LEPIDOPTERA: NOCTUIDAE)

Mexico is the seventh largest producer of corn in the world. Corn in Mexico is split into two seasons, the spring/summer crop, accounting for approximately 75 percent of total production, followed by the fall/winter crop. The main crop is planted from April through August and relies predominantly on monsoon rainfall, as approximately 85 percent of the main crop is rainfed. France is also among the top 10 corn producers in the world, with 1.5 million tons of corn produced annually in the Région Centre-Val-de-Loire. This crop is affected by various lepidopteran pests, among which is the fall armyworm, *Spodoptera frugiperda*. The Laboratory of Food and Agricultural Biotechnology of the University of Guanajuato, in Mexico, has worked with 6 SfNPV baculovirus strains with activity towards *Spodoptera frugiperda*, which have been characterized at a biological and molecular level, and these strains have presented a high bioinsecticide potential when presenting high levels of virulence against this pest. However, these strains have not been studied in greater depth, and no phylogenetic studies have been carried out. In Mexico, baculoviruses are not used as biological control agents in any proportion. They are not produced, are not commercialized, and have not been developed as an alternative to chemical control in crops' importance. The results obtained from this research will allow the development of biological insecticides against corn fall armyworm, which can be used in all regions of the world where this insect has already shown its harmful effect on corn crops, and will also contribute to a decrease in the use of chemical insecticides to control this pest.

The objective of this project is to perform the genetic characterization of 6 baculovirus isolates (3 exotic and 3 native to Mexico) to determine which genetic factors might be involved with increased pathogenicity against *S. frugiperda*. This will be done through the genetic characterization of the 6 SfNPV isolates, first to determine if phylogenetic relatedness explain phenotypic similarity (3 genes), in order to determine if particular genomic features could explain phenotypic differences (genome sequencing), while host specificity assays will be performed (useful in case of product licensing in Europe). The development of biological insecticides for use in the field, in the control of insect pests of agricultural importance, is undoubtedly a multidisciplinary aspect. Indeed, scientists, producers, farmers, and final consumers of the innocuous food product are involved in this process, as food will be produced free of chemical inactivate, which will strengthen human health and help in the protection of the environment. To carry out this type of project, it is necessary that experts in agronomy, biology, biochemistry, molecular biology, marketing, as well as other fields be involved in the development of viral bio-insecticides at a commercial level. Even though there are currently no issues with *S. frugiperda* in France, it has already been detected in continents such as Africa and Asia, so this research could be very relevant to prevent the introduction of this pest to France. It is important to train producers to measure the impact of the presence of this pest if required and know the biological measures that exist for their control.

2021 INTERNATIONAL CONGRESS ON INVERTEBRATE PATHOLOGY AND MICROBIAL CONTROL & 53RD ANNUAL MEETING OF THE SOCIETY FOR INVERTEBRATE PATHOLOGY

The conference took place from the 28th of June to the 2nd of July 2021, hosted by LE STUDIUM in the Loire Valley, France and chaired by Elisabeth Herniou from IRBI, CNRS-University of Tours and María Cristina Del Rincón-Castro from the University of Guanajuato (Mexico). The meeting offered a scientific program exploring the latest fundamental and applied findings in invertebrate pathology, including microbial control, diseases of beneficial invertebrates, and advances in fundamental research on host-pathogen interactions, including with bacteria, fungi, microsporidia, nematodes and viruses. Over 170 contributed papers and posters were received on the conference website. Among the scientific highlights, the society divisions put together stimulating symposia, with the plenary symposium on "Current challenges for the microbial control of *Spodoptera frugiperda*".



The baculoviruses in this electron microscopy image are used for the biological control of caterpillar pests of crops.

SCIENTIFIC COMMUNICATION

Dr María-Cristina Del Rincon-Castro

- Del Rincón-Castro, M.C. Baculovirus: an entomopathogenic virus with high potential as biological pest control agents. Oral communication at LE STUDIUM Thursday Seminar, Tours, France, 1st April 2021.
- Rángel-Núñez J.C.; Del Rincón-Castro, M.C. Identification of differential genes in primary infection of *Spodoptera frugiperda* (Lepidoptera:Noctuidae) with an SfNPV baculovirus, Oral communication at 2021 International Congress on Invertebrate Pathology and Microbial Control & 53rd Annual Meeting of the Society for Invertebrate Pathology, Tours, Loire Valley, France, 28th June to 2nd July 2021.
- Zanella Sainz, I.; Herniou, E.; Del Rincón-Castro, M.C. Characterization of native Mexican strains of baculovirus with virulence towards *Spodoptera frugiperda* (Lepidoptera:Noctuidae). Oral communication at 2021 International Congress on Invertebrate Pathology and Microbial Control & 53rd Annual Meeting of the Society for Invertebrate Pathology, Tours, Loire Valley, France, 28th June to 2nd July 2021.



Dr Grégory Guirimand Tanaka

LE STUDIUM Research Fellow

From: Kobe University - JP

In residence at: Biomolecule and Plant Biotechnology (BBV) - Tours

Nationality: French

Programme : ARD 2020 BIOPHARMACEUTICALS

Dates: June 2019 to March 2021

Having lived in Japan since 2011, Grégory Guirimand became an Assistant Professor at Kobe University in 2016, intensively working on metabolic and cell surface engineering of baker's yeast (*Saccharomyces cerevisiae*). His research interests are very broad, from plant and yeast biotechnologies, to synthetic biology, for the bio-production of high value-added therapeutic biomolecules in microbial cell factories. His main achievements include but are not limited to the publication of 25 research articles (14 h-index), 9 oral presentations (4 as invited speaker) at international conferences, as well as the co-invention (10%) of a biotechnological process for xylitol bio-production from Kraft Pulp. Grégory Guirimand believes that his work within the BBV Laboratory as a Le Studium Research Fellow has been a unique opportunity to combine his knowledge of specialized metabolic pathways of *Catharanthus roseus* with his skills of bio-engineering of yeast cells, in order to sustainably produce valuable anticancer molecules.



Dr Vincent Courdavault

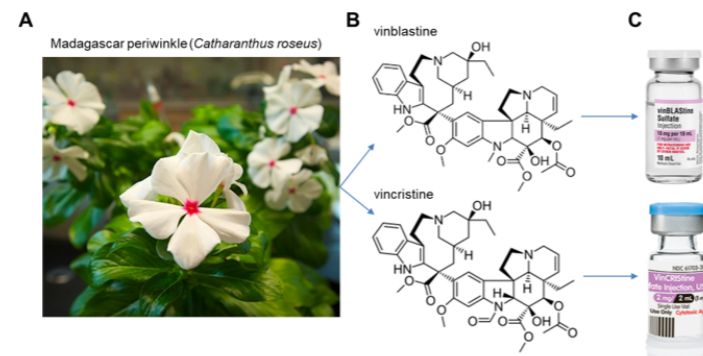
Host Scientist

Vincent Courdavault is an Associate Professor at the University of Tours in the EA2106 BBV laboratory. He is working on the elucidation of the biosynthetic pathways of plant natural products with a particular focus on anticancer alkaloids and the production of these compounds through metabolic engineering strategies in microbiological cells. He recently contributed to the elucidation of the last steps of the biosynthesis of Vinca alkaloids in the Madagascar periwinkle and to the elaboration of the first yeast strain producing monoterpene indole alkaloids. He has published 117 research articles/12 book chapters and has 35 h-index. He is a reviewing editor for *Frontiers in Plant Science* and editor for the "MDPI plants" journal. He is currently leading research programs aiming at securing the supply of anticancer compounds and is the scientific coordinator of the European H2020 project MIAMI in Tours.

BIO-PRODUCTION OF VINDOLINE AND CATHARANTHINE BY RECOMBINANT YEAST CELL FACTORIES

The tropical plant Madagascar periwinkle (*Catharanthus roseus*) is a natural source of anticancer monoterpene indole alkaloids (MIA), such as vinblastine and vincristine, two molecules of major interest and therapeutic values. In planta, the MIA biosynthetic pathway in *C. roseus*, described in the literature as the most complex pathway in all living organisms, shows an outstanding compartmentation at both cellular and subcellular levels. This drastic compartmentation is potentially responsible for the extremely low level of production of these MIA in planta. In order to overcome this issue, the team's approach consists in producing these molecules in a heterologous system such as yeast cell factories. The present research project supported by the ARD2020 Biopharmaceuticals Programme is a very ambitious one, aiming to produce vindoline and catharanthine, (the monomeric precursors of vinblastine and vincristine) in yeast cell factories by using cutting-edge techniques of synthetic biology and metabolic engineering of *S. cerevisiae*.

In total, the biosynthetic pathway leading to vindoline from tabersonine encounters 7 enzymatic steps, while the catharanthine biosynthesis from tryptamine and secologanin encounters no less than 12 steps.



The construction of such kind of yeast cell factories, able to produce vindoline and catharanthine respectively, requires the previous transfer of each gene (cDNA) coding for each corresponding enzyme from the plant cells to the yeast cells. Once all the target genes have correctly integrated into the genome of *S. cerevisiae*, another important challenge consists in the rational coordination of them altogether, in order to ensure a proper metabolic flux in the yeast cells, for an optimal bio-production ability of the system.

In this context, an intensive preliminary work of molecular biology has been conducted. This work has allowed the team to obtain a full set of more than 12 different vectors containing bidirectional strong promoters. Each vector allows to stably integrate two different enzyme genes simultaneously into the genome of yeast cells. To achieve this goal, they used the cutting edge molecular tool CRISPR-Cas9 to ensure a strong stability and expression levels of the transgenes. This powerful approach enabled them to generate the recombinant yeast cell factories *S. cerevisiae* CENPK "Vindoline I3.0" and *S. cerevisiae* CENPK "Catharanthine I3.0", which will be used for the industrial bio-production of vindoline and catharanthine, respectively.

At this point of the project, the strain *S. cerevisiae* CENPK "Vindoline I3.0" has been fully established and scale-up experiments conducted with this strain show promising results. In particular, this strain shows a very high fidelity (with a reproducibility ≈10 times greater than that previously observed), and a very high efficiency of tabersonine bio-conversion (~85% efficiency, against ~30% for the previous strains) along with an unprecedented production of 266 mg.L⁻¹ of vindoline, as reported in Kulagina et al 2021. These results prove the robustness of the team's approach, and make this strain an excellent candidate for technology transfer to their industrial partner. The strain *S. cerevisiae* CENPK "Catharanthine I3.0", containing a more complex biosynthetic pathway, is still under construction.



Prof. Maxwell Hincke

LE STUDIUM Research Professor

From: University of Ottawa - CA

In residence at: Avian Biology & Poultry Research (BOA) - Tours

Nationality: Canadian

Programme : SMART LOIRE VALLEY

Dates: March 2018 to May 2018
March 2019 to May 2019
March 2020

Maxwell Hincke (PhD, Univ. Alberta, 1981) is a senior scientist and tenured Full Professor in the Faculty of Medicine at the University of Ottawa. He is former Head of the Division of Clinical and Functional Anatomy, and has been a member of the Senate of the University of Ottawa. He investigates integrated defense strategies that operate at biomineralized barriers to understand molecular control of calcific biomineralisation and antimicrobial strategies. His vision is that the insight gained can be reverse-engineered for application to human health and therapeutics. His CV includes: >110 refereed journal publications; mentorship: >115 undergraduate & graduate students, postdoctoral fellows and clinical trainees; awards: Excellence in Mentorship; international research collaborations with extended sojourns in France, Spain and China.



Dr Sophie Rehault-Godbert

Host Scientist

Sophie Réhault-Godbert (PhD, Univ. of Tours, 2001) is currently the co-director of the unit Défenses de l'Oeuf, Valorisation, Evolution (DOVE). She has expertise in the physiology of chicken egg formation, egg defenses, functional and structural characterisation of egg proteins including proteases, antiproteases and antimicrobials, and has coordinated a project aiming at evaluating the therapeutic potential of egg-derived molecules against microbial infections, inflammation and cancer. Her research addresses the role of egg proteins and the regulation of egg defenses during chicken embryonic development. She has authored >45 peer-reviewed articles, 8 book chapters, and holds one patent. She was a partner in various DOVE-coordinated projects.

INNATE IMMUNITY IN A BIOMINERALIZED CONTEXT: TRADE-OFFS OR SYNERGIES?

Biomineralized structures can function as a barrier to the external environment, and as such are conceptually entwined with innate immune processes. Disentangling immune and biomineralization mechanisms represents a significant challenge for researchers trying to understand how organisms could integrate biomineral formation and plasticity with maintenance of critical innate immune protection. In fact, there is increasing evidence that immune proteins can serve genuine dual-functional roles, both in regulation of biomineralization, as well as resisting pathogens. This awareness is growing in models as diverse as the dual-functioning haemocytes of marine bivalves, and in mineralization / demineralization of the avian eggshell. Moreover, reef corals, in which calcification is coupled to the photosynthetic activity of their mutualistic symbiots, must adapt their innate immune system to achieve this tolerance. Cnidarian immune-related processes in response to abiotic stresses are increasingly implicated in loss of symbiosis and coral bleaching.

This conference aimed to bring together scientists working with diverse models of biomineralization, for an exchange of perspectives on the innate immune function of the calcified barrier and the dual role played by specific genes / proteins in these two critical functions.

The virtual conference took place on March 23rd-24th, 2021. The convenors (Maxwell Hincke, Studium Research Professor and Sophie Rehault-Godbert, INRAE) were ably assisted by Maurine Villiers, Events Projects Officer.

Two internationally reputed experts were recruited as keynote speakers for the first session (Overview Of Innate Immunity):

- Prof. Bernd Kaspers, University of Munich, Germany "The developing immune system of the chicken embryo".
- Prof. Marc McKee, McGill University, Canada "The structure of avian (chicken) eggshell".

Sixteen speakers presented talks within their specialized domains, with a focus on "Innate immunity and biomineralization", which were organized into the following sessions: Avian Eggs: Structure, Microbiota And Molecules Of Innate Immunity, Bone, Theme Invertebrates (Bivalves, Snails) and Corals. An Integrative Workshop was held at the end of each day, which were oriented around the following topics: "Avian eggshell biomineralization and innate immunity", and "Lessons learned and the path forward for innate immunity in biomineralization". A flash-poster presentation (3 min) session was organized, with 3 speakers.

As a follow-up, the convenors and speakers were motivated to persuade the Frontiers publishing organization to host a Special Topic Edition "Innate Immunity in a Biomineralized Context", with the following guest editors: M. Hincke, S. Rehault-Godbert, C. Blin-Wakkach, F. Marin, N. Traylor-Knowles. <https://www.frontiersin.org/research-topics/23328/innate-immunity-in-a-biomineralized-context#overview>





Dr Duangjai Tungmunthum

LE STUDIUM Research Fellow

From: Department of Pharmaceutical Botany, Mahidol University - TH

In residence at: Laboratory of Woody Plants and Crops Biology (LBLGC) - Chartres

Nationality: Thai

Programme: ARD CVL COSMETOSCIENCES

Dates: September 2021 to August 2022

Duangjai Tungmunthum completed her Ph.D. from Chulalongkorn University, Thailand, in 2016, and was awarded the DPST Postdoctoral Fellowship to conduct her Postdoctoral research in Japan at the National Museum of Nature and Science in collaboration with the University of Tokyo, Japan. There, she focused on medicinal plants and phytochemistry. After completing her research in Japan, she quickly got a permanent lecturer position at the Faculty of Pharmacy of the Mahidol University, Thailand. She specializes in biochemistry, innovative green extraction methods, biological activity both antioxidant and anti-aging from plant extracts and pure phytochemical compounds for cosmetic and pharmaceutical applications in *in-vitro*, *in-vivo* and *in-cellulo* models. Through her research profiles, she received a research grant as an outstanding young scientist of Mahidol University and the Junior Research Fellowship from the French Government, followed by the French-Thai Mobility Programme 2020-2021 funding by French and Thai Governments. Currently she is a LE STUDIUM Research Fellow in the LBLGC team.



Dr Christophe Hano

Host Scientist

Dr. Christophe Hano is an associate professor who is an expert in phytochemistry, plant molecular biology and plant biotechnology at the LBLGC laboratory (INRAE USC1328 Orléans University) working on the regulation of the biosynthetic pathways of specialized plant metabolites in relation with plant development and impact of environment. Using combined and integrated approaches coupling metabolomics, fluxomics and transcriptomics analysis the main goals of this research are to determine the favorable conditions for the production of plant specialized metabolites and to identify metabolic locks. In brief: he has published more than 160 papers in international Scientific Journals; he is the secretary for the French Plant Specialized Metabolism network and French representative as well as board member in the Phytochemical Society of Europe. He is also a scientific expert for more than 50 International Scientific Journals, and an Editorial board member and/ or Guest Editor for several Journals in the fields of plant natural products.

NATURAL DEEP EUTECTIC SOLVENTS (NADES): COSMETICS IN THE AGE OF GREEN TECHNOLOGIES

The title of the research project supported by LE STUDIUM is PIERIC, which is part of the COSMETOSCIENCES project. There are three main goals to this project. The first one is to create green NaDES-based extraction methodologies for various plant natural product categories from diverse plants for cosmetic applications. The second goal is to characterize the phytochemical compounds of the selected plants species, while the last one is to evaluate the biological activities of these extracts. This part of the project will be carried out in close collaboration with teams from other regional laboratories : ICOA (Organic and Analytical Chemistry - University of Orleans/CNRS), NMNS (Nanomedicines and Nanoprobe – University of Tours) and SIMBA (Synthesis and Isolation of Bio-Active Molecules - University of Tours) and industrial partners.

The six species of potential plant material have been selected and the extraction optimization has been performed. Various types of the new deep natural eutectic solvents (NaDES) for extraction methods have been developed and validated. The phytochemical compounds of the selected plants species have been characterized, and their biological activities such as *in vitro* antioxidant potentials of the green extracts have been investigated using various assay methods, such as ABTS, DPPH, FRAP, and ORAC, in order to cover all the antioxidant mechanisms of the optimized extracts. Accordingly, the current results of the project have been communicated in the form of an oral presentation in a scientific seminar. In addition, three manuscripts have been submitted to the high-quality international journals in Q1 SJR Scimago Rank, and all three are currently in the peer-review process.



The green NaDES-based extraction methodologies for various plant natural product categories from diverse plants/ plant by-products for cosmetic applications.



Dr Kathia Zaleta

LE STUDIUM / Marie Skłodowska-Curie Research Fellow

From: University of California San Diego - USA

In residence at: Imaging and Brain laboratory (iBrain) - Tours

Nationality: Mexican

Programme: SMART LOIRE VALLEY

Dates: November 2020 to October 2021

Dr. Kathia Zaleta completed her PhD at the University of Nebraska-Lincoln in the United States in collaboration with CINVESTAV-IPN in Mexico city. During her PhD studies, she investigated the catalytic mechanisms of modular megasynthases, such as polyketide synthases (PKS) and the Non-ribosomal peptide synthetases (NRPS), with the goal of reprogramming their chemistry for preparing novel natural products with potential drug activity. This work set the basis for the development of novel custom molecules by genetic manipulations of the gene clusters involved in their biosynthetic mechanisms. She completed her postdoctoral training at Stanford University where she designed a therapy to treat patients with the cardiovascular disease Hypertrophic Cardiomyopathy (HCM) using small interference RNAs (siRNAs) and antisense oligonucleotides (ASOs) to allele specific silencing single nucleotide variants causative of the disease. This research work was published in 2020 in *Circulation*, a high impact factor journal ranked 1st among journals in the cardiovascular category and a patent that was filled in 2015. In 2020 she was awarded a LE STUDIUM/Marie Skłodowska research award and joined the iBrain research unit at the Université de Tours. She successfully completed her fellowship in November 2021.



Prof. Patrick Vourc'h

Host Scientist

Prof. Patrick Vourc'h is the head of the Department of Genetics at the CHRU of Tours, professor in biochemistry at the faculty of medicine at the University of Tours, assessor (research) of the Dean of the Faculty of Medicine and President of the Biomedical Research and Public Health Committee (CRBSP) of the Region Centre-Val de Loire. As the head of the platform of genomics of the University of Tours and of the platform of molecular biology of the CHRU of Tours, he has access to high throughput sequencing, transcriptomics. He maintains regional, national and international collaborations (ie. Montpellier Neuroscience Institute, Polytechnic Institute of Mexico City, Utrecht University, European Consortium Strength and Mine on ALS). He is a member of the team "Neurogenomics and neuronal physiopathology" of the iBRAIN research unit (University of Tours, INSERM). The team is part of the reference centre for ALS (CHRU of Tours) where Prof. Vourc'h is particularly involved in molecular diagnosis for patients with ALS and ALS-FTD (dementia). The team is member of the Labex MablImprove (Laboratory of Excellence, monoclonal antibodies).

PROTEIN TRANSLATION ENHANCEMENT FOR THE TREATMENT OF NEURODEGENERATIVE DISEASES

Synaptic transmission is of critical importance for the neurons to communicate, and abnormalities are observed in neurodegenerative diseases, psychiatric disorders, and intellectual disability. Loss of the synaptic vesicle proteins is shared among these disorders and is being noted as one of the earliest hallmarks of neurodegenerative diseases. Therefore, novel therapeutics targeting synapses are fundamental to improve brain plasticity and maintain healthy brain function. Here, Dr Zaleta and her team propose to normalize synaptic protein levels by targeting unstable synaptic mRNAs using antisense RNA enhancer molecules with the 'long-term goal' of developing a therapy for patients with synaptic dysfunction, specifically in Alzheimer's Disease (AD) and Amyotrophic Lateral Sclerosis (ALS). The team's 'hypothesis' is that stabilization of unstable synaptic mRNA's by antisense RNA molecules will be effective in enhancing and restoring the levels of downregulated synaptic proteins in AD and ALS. As a 'proof of concept', antisense RNA molecules targeting 5'UTR regions of unstable synaptic genes (synapsin and synaptophysin) fused to enhancer elements such as SINE and/or CSE replicase recognition sites were designed. To explore its efficacy and specificity, three different binding domains that span the 5'UTR region and transcription start sites (-40/+32, -40/+4, -14/+4) per gene were prepared and screened in a cell line that endogenously expresses the target genes. Our preliminary results show that SINEUP elements (See Figure) enhanced protein translation of the synapsin dimer by 80% and the monomers by 40%, while the CSE elements in combination with the replicase increased translation of the monomers by 50-80%. This significant enhancement can stimulate synaptogenesis, synaptic vesicle recruitment, and maintain the mature synapses. An increase in synaptophysin was also observed. *Ex vivo* studies using a diseased cell model are in progress to assess phenotype and function. This is a promising step toward targeting synapses in neurodegenerative diseases.

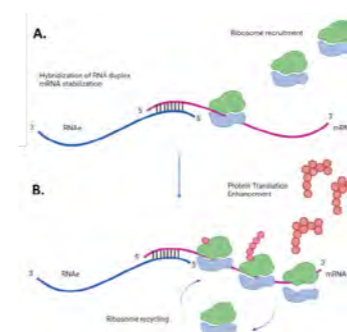


Figure: A. Hybridization of the RNA enhancer molecule with the target mRNA at the 5' end and ribosome recruitment through the SINE elements. B. Protein translation enhancement and ribosome recycling.





Prof. Adrian Wolstenholme

LE STUDIUM / Marie Skłodowska-Curie
Research Fellow

From: University of Georgia - USA

In residence at: Infectiology and Public Health (ISP) - Tours

Nationality: English

Programme: SMART LOIRE VALLEY

Dates: September 2020 to December 2021

Adrian Wolstenholme obtained his PhD in Virology from the University of Cambridge in 1980. After several years doing post-doctoral research into molecular virology in London and the USA, he obtained a faculty position in Biochemistry at the University of Bath in 1988. Here, he became interested in invertebrate neuroscience, especially of parasitic nematodes, and built a successful research team studying drug targets in these organisms. He was awarded two brief sabbaticals, at Flinders University of South Australia and Oxford University, before moving to the University of Georgia in 2009, where he became a full Professor of Infectious Diseases. He served on the Pathogenic Eukaryotes Study Section of the NIH for 5 years and co-organised a series of 5 international symposia on Anthelmintic drugs. He acted as joint Editor-in-Chief of Invertebrate Neuroscience for 9 years and was on the editorial board of two other international journals.



Dr Cédric Neveu
Host Scientist

Cédric Neveu was originally trained as a plant parasitologist and started applying his molecular skills to animal parasitic nematodes when he got a permanent position at the French National Institute for agronomical research (INRAE). He is currently heading a research group specialized in the identification of anthelmintic mode of action and molecular mechanisms associated with resistance.

FURTHER DEVELOPMENT OF CAENORHABDITIS ELEGANS AS A TOOL FOR STUDYING DRUG TARGETS FROM PARASITIC NEMATODES

Adrian Wolstenholme and his team aim to develop a novel approach to optimize the use of a free-living nematode, *Caenorhabditis elegans*, as an expression system for genes from parasitic nematodes. In this project, they have chosen to use CRISPR/Cas9 to remove *C. elegans* genes and homology directed repair to insert the parasite sequences into the same locus. Their target genes encode subunits of the glutamate-gated chloride channels and the nicotinic acetylcholine receptors; both families are the targets of widely used anthelmintic drugs, including ivermectin, levamisole and the tetrahydropyrimidines morantel and pyrantel.

Their initial experiments concentrated on *glc-3*, a gene conserved in both *C. elegans* and parasitic nematodes that encodes a subunit of the glutamate-gated chloride channels that is sensitive to ivermectin. They have confirmed and extended previous results on the expression pattern of the gene in *C. elegans*, showing that the subunit is expressed in interneurons involved in integrating responses to sensory stimuli, and controlling the worm's movement. The team designed CRISPR/Cas9 guide RNAs to cut the *C. elegans* gene at both ends and successfully injected these into the N2 strain along with a reporter plasmid that encoded three genes, including markers for abnormal movement (*rol-6*), drug resistance and GFP. They were able to find many drug-resistant worms with defective movement following injection, indicating that the procedure had been successful, but only faint GFP fluorescence was observed in multiple attempts and it proved impossible to obtain a strain in which the gene had been deleted in a homozygous manner – a pre-requisite for the insertion of parasite sequences. In an attempt to explain this rather surprising result, they used the polymerase chain reaction to look for the presence of additional potential gene products and identified a severely truncated mRNA transcript, which they called *glc-3T*, from the parasitic species *Haemonchus contortus* which would encode a short polypeptide corresponding to the N-terminal region of the full-length protein. This transcript, derived via an intron retention event, is reminiscent of truncated mRNAs identified from other drug targets and which have been implicated in drug resistance. A similar difficulty in obtaining homozygous knock-out strains has been noted for other potential targets, including *acr-16* and *unc-38*, both of which encode subunits of the nicotinic acetylcholine receptor, the second family of drug targets under study. These data imply a greater complexity to the expression and function of these genes than was previously known, and this complexity is the subject of the team's ongoing and future work.

NEW APPROACHES TO GET AROUND ROUNDWORMS

Objectives - the establishment of focus working groups on specific research themes addressing the state of the art in areas such as the immune response, drug action and resistance as well as genomic/transcriptomic analyses of ascarids.

Outcomes - There were 93 registered attendees (on-line), with 7 invited speakers and 15 other oral presentations. The final discussion was productive and has led to an invitation to produce an article, 'A new research agenda for parasitic ascarids: Future approaches to get around the roundworms' for *Advances in Parasitology* for publication in 2022. Attendees were invited to organise a follow-up Symposium at the International Congress of Parasitology (ICOPA) to be held in Copenhagen in summer 2022.



SCIENTIFIC COMMUNICATION

Prof. Adrian Wolstenholme

- Wilson, N.E.; Price, E.; Reaves, B.J.; Wolstenholme, A.J. Using a primary *C. elegans* mutant screen to identify candidate genes that affect the ivermectin sensitivity of the filarial worm *B. malayi* after RNAi. Oral communication at the Molecular Helminthology Conference, 1st-3rd June, 2021 (on-line) and at the American Association for Veterinary Parasitology, Lexington, KY, USA, 19th-22nd June 2021.
- Wolstenholme, A. J.; Neveu, C. Avermectin targets in parasitic nematodes, Oral communication at the American Chemical Society, Atlanta GA, USA, 22nd-26th August 2021.
- Wolstenholme, A. J. Resistance to heartworm preventatives, Seminar, Iowa State University, Ames IA USA, 8th April 2021.
- Lamassiaude, N.; Courtot, E.; Corset, A.; Charvet, C.L.; Neveu, C. Functional investigation of conserved glutamate receptor subunits reveals a new mode of action of macrocyclic lactones in nematodes, Oral communication at the 28th Conference of the World Association for the Advancement of Veterinary Parasitology, Dublin, Ireland, 19th-22nd July 2021.
- Wolstenholme, A.J. *C. elegans* as a model for ascarid parasites; levamisole receptors, Oral communication at LE STUDIUM Conference: New Approaches to get around roundworms, Tours, 29th November-1st December 2021.
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Prof. Brice Korkmaz

LE STUDIUM Consortium Coordinator

Brice KORKMAZ received his Ph.D. from the University of Tours in 2005 (supervisor: Prof Francis Gauthier). He was recruited by INSERM in 2009 after postdoctoral placements in France (INSERM U618), the United States (Seattle, University of Washington; medical genetics; supervisor, Prof Marshall Horwitz), and Germany (Munich, Max Planck Institute of Neurobiology; supervisor, Dr. Dieter Jenne). He has extensive expertise in biochemistry/enzymology and in neutrophilic chronic inflammatory/autoimmune diseases. He has been responsible for a research group (therapeutic targeting of neutrophilic proteases) in team 2 of INSERM-U1100 since 2012. He has been the chair of the International Cathepsin C Consortium ICat-CC since 2016. He demonstrated that the inhibition and disappearance of NSPs, as observed in patients with CatC deficiency, can be induced by systemic pharmacological inhibition of CatC. This proof of concept validated the relevance of using CatC as a therapeutic target and opened up new perspectives for future therapeutic

PHARMACOLOGICAL TARGETING OF CATHEPSIN C: A KEY THERAPEUTIC TARGET IN CHRONIC INFLAMMATORY AND AUTO-IMMUNE DISEASES

Cathepsin C (CatC), also known as dipeptidyl peptidase I, is a lysosomal amino peptidase belonging to the papain family of cysteine peptidases. CatC catalyzes the cleavage of two residues from the N-termini of peptides and proteins. CatC, which is ubiquitously expressed in mammals is considered to be a major intracellular processing enzyme. The best well-known function of CatC is the activation of immune cell-associated pro-inflammatory serine proteinases such as neutrophil serine proteinases (NSPs). The main objective of the «Cathepsin C's Five» consortium is to explore the pharmacological targeting of CatC in fundamental/translational research for drug development and to create productive international collaboration with the public sector and the pharmaceutical industry. The creation of such a consortium will allow the emergence of new large-scale research programs highlighting the expertise of each and thus making it possible to respond effectively to international calls for tenders.

Pharmacological inhibition of CatC in respiratory diseases: the consortium also benefits from the active support of the INSMED laboratory (USA), which Dr B Korkmaz chairs as an expert, the scientific council for research on the CatC inhibitor, brensocatib (BRAB, Brensocatib Advisory Board), currently being evaluated in multiple lung diseases [Chalmers et al., 2020, NEJM]. Brensocatib is currently tested in a phase 3 clinical trial as a novel anti-inflammatory therapy for patients with bronchiectasis. In the current context, the members of the consortium have adapted their research and set up a program which consists in analyzing and targeting CatC/NSPs in patients with COVID-19. The results published in European Respiratory Journal [Seren et al., 2021] have initiated a Phase 3 clinical study in patients with COVID-19. Inhibition of CatC in a murine model of acute lung inflammation is in progress (Dr I Couillin, collaborator 2, INEM, Orleans, France).

Pharmacological inhibition of CatC in cancer: Epidemiological studies established an association between chronic inflammation and higher risk of cancer. Inhibition of proteolytic enzymes represents a potential treatment strategy for cancer and prevention of cancer metastasis. Upregulation of CatC expression was observed in different tissues during carcinogenesis and correlated with metastasis and poor patient survival. In a review published in Biochemical Pharmacology the members of the consortium described the pathophysiological function of CatC and discuss molecular mechanisms substantiating pharmacological CatC inhibition as a potential strategy for cancer treatment. Inhibition of CatC in a murine model of smoke induced lung cancer is in progress (Dr AO Yildirim, collaborator 3, CPC, Munich, Germany).

Pharmacological inhibition of CatC in ANCA vasculitis: Anti-neutrophil cytoplasmic autoantibodies (ANCA)-associated vasculitis (AAV) is an autoimmune systemic small-vessel disease. AAV patients harbor ANCA either to proteinase 3 (PR3) or myeloperoxidase (MPO) both autoantigens exclusively expressed by neutrophils and monocytes. NSPs are implicated as disease mediators employed by the myeloid effector cells to induce necrotizing vasculitis. Pharmacological CatC inhibition strongly reduced NSPs in bone marrow and peripheral neutrophils in mice encouraging clinical studies with adjunctive CatC inhibitor administration in PR3-AAV patients [Jerke et al., submitted].

European Proposal EURO-PROT: The participants of the International Cathepsin C Consortium (ICat-CC) set up in 2016 and Partners of Cathepsin C's Five have joined forces to submit an EU proposal named EURO-PROT (European platform for the repositioning of medicinal products targeting pro-inflammatory neutrophil serine proteases, Coordinator: Brice KORKMAZ, HORIZON-HLTH-2021-DISEASE-04-02). The EURO-PROT proposal brought together 47 Partners belonging to 34 Institutions from 14 EU and Associated Countries with a strong complementarity and synergistic approach to address all the ambitious objectives of the call.

PARTNERS



Prof Adam LESNER

has extensive experience on design and development of protease substrates/inhibitors.

University of Gdansk - Poland



Prof Joanna CICHY

provides an experimental platform for detailed evaluation of CatC inhibitors and novel chemical tools in skin pathophysiology, focusing predominantly on psoriasis.

Jagiellonian University - Poland



Prof Pedro BULLON

has a wide experience with research in dentistry and is collaborating with Dr Mario Cordero (FGIBICA, Spain) for research on autophagy.

University of Sevilla - Spain



Prof Ralph KETTRITZ

contributes to the project by characterizing the effect of inhibiting CatC and CatC-like proteases that are involved in NSP zymogens maturation in vitro and in vivo

Charité-Universitätsmedizin - Germany

SCIENTIFIC COMMUNICATION

Prof. Brice Korkmaz

- Korkmaz, B.; Lamort, A.S.; Czaplowski C.; Lesner, A.; Geldon, A. Biochemical and molecular modeling of neutrophil serine proteases maturation, Oral communication at the 6th Polish-Korean Conference on Protein Folding, Jastrzebia Gora, Poland, 17th-21st October 2021
- Korkmaz, B.; Keleş, I. Cathepsin C as therapeutic target in cancer, Oral communication at the 8th Multidisciplinary Cancer Research Congress, European Association for Cancer Research, MOKAD (Molecular Cancer Research Association in Turkey), Istanbul, Turkey, 15th-17th January 2021. (online congress)
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SCIENTIFIC COMMUNICATION

Dr Grégory Guirimand Tanaka

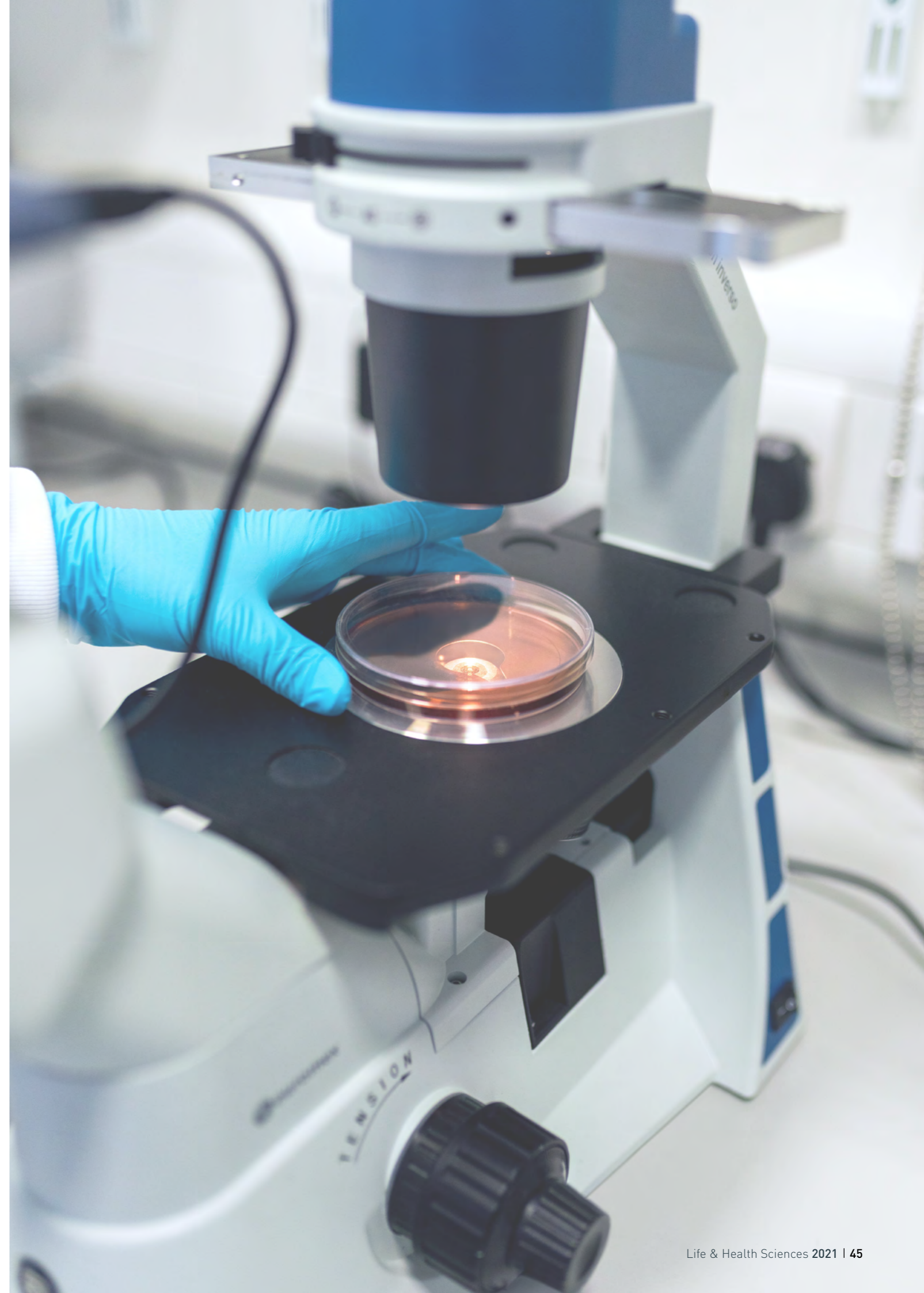
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Dr Duangjai Tungmannithum

- Tungmannithum, D.; Natural deep eutectic solvents: A green way to valorize plant products for cosmetic applications, Oral communication at LE STUDIUM Thursday Seminar, Chartres, France, 7th October 2021.

Dr Katia Zaleta

- Zaleta, K. Targeting synaptic dysfunction using antisense RNA enhancers in neurodegenerative diseases, Oral communication at LE STUDIUM Thursday Seminar, Tours, 9th September 2021.
- Zaleta, K. Protein Translation enhancement therapy for the treatment of neurodegenerative diseases, Oral communication at 33e Colloque Biotechnocentre, Center Parc- Les Hauts de Bruyeres, 7th October 2021





EARTH ECOLOGY & ENVIRONMENT SCIENCES

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CENTRE DE BIOPHYSIQUE MOLECULAIRE (CBM) UPR 4301 - CNRS



The Center for Molecular Biophysics (CBM) is a research unit of the French National Scientific Research Center (CNRS). The CBM develops research at the interface of chemistry, biology and physics to study the molecular mechanisms that sustain life or dysfunctions leading to diseases. The CBM was founded in 1967 and from there biophysics first developed in France (the French Biophysics Society was created in Orléans). The CEI research interests focus on the understanding of the origin and early evolution of life on Earth, and the search for life elsewhere throughout the study of the 1) origins of prebiotic molecules, 2) oldest traces of life, 3) Biosignatures and artificial fossilisation, and 4) Space exploration and the search for life on Mars and elsewhere in the solar system. The CEI group is strongly involved in the scientific and instrumental aspects of the European/Russian ExoMars 2020 rover mission.



BUREAU DE RECHERCHE GÉOLOGIQUE ET MINIÈRE (BRGM)

BRGM, as we know it today, is the result of two centuries of scientific exploration. Since its founding in 1959, the French Geological Survey has continually adapted to economic, geopolitical, and technological changes. From its creation in 1959 to meet the new challenges of the sub-surface, through major dates and many adventures, BRGM has become one of the internationally-recognized organizations in the fields of geoscience and environmental issues.

Under partnerships with numerous public and private stakeholders, it focuses on scientific research, providing scientifically-validated information to support public policy development and international cooperation.

Its activity meets 4 objectives:

- understanding geological phenomena and related risks,
- developing new techniques and methodologies,
- producing and distributing data for surface, subsurface and resource management,
- providing the tools required to manage the surface, subsurface and resources, prevent risks and pollution, and manage policies in response to climate change.

It is in line with six major scientific and societal challenges: geology and knowledge of the subsurface, groundwater management, risks and spatial planning, mineral resources and the circular economy, energy transition, data and digital infrastructures.



BIOLOGIE INTÉGRÉE POUR LA VALORISATION DE LA DIVERSITÉ DES ARBRES ET DE LA FORÊT (BIOFORA)

UMR 0588 - CENTRE INRAE VAL DE LOIRE, ONF



The UMR 0588 BioForA (ex-AGPF) is an INRAE Research Unit belonging to INRAE Val de Loire and located near the Orléans University campus. BioForA depends on the INRAE EFPA department (Ecologie des Forêts, des Prairies et des milieux Aquatiques), which coordinates environmental studies carried out on forests, grassland and fresh waters. BioForA brings together specific skills in breeding, genetics, genomics, physiology and wood sciences applied to forest trees. BioForA develops integrative biological approaches to produce knowledge on the genetic determinism of complex traits involved in tree development (phenology, growth, wood properties) and on the mechanisms of tree adaptation to environmental constraints, such as resistances to pathogens, climate, including, through collaborations, resistance to drought. In BioForA, the breeding programs developed on different forest tree species (poplar, Douglas-fir, larch, ash, Scots pine and wild cherry) rely on innovative strategies for the selection and dissemination of genetic gains. In addition, BioForA scientists assess and manage forest tree genetic diversity to define the most effective strategies for combining short-term adaptation towards environmental and economic challenges and preserving long-term conservation of the genetic resources. Therefore, the research leads to a variety of scientific productions ranging from scientific papers to new forest varieties.



LABORATOIRE DE PHYSIQUE ET CHIMIE DE L'ENVIRONNEMENT ET DE L'ESPACE (LPC2E)

UMR 7328 - UNIVERSITÉ D'ORLÉANS, CNRS, CNES



The LPC2E (Laboratoire de Physique et Chimie de l'Environnement et de l'Espace) is a joint research unit of the CNRS, the University of Orleans and the CNES (Centre National des Etudes Spatiales). In common with the ISTO (Institut des Sciences de la Terre d'Orléans) and the Station of Radioastronomy of Nançay, it is one of the founding laboratories of the OSUC (Observatoire des Sciences de l'Univers de la région Centre-Val de Loire).

The fields of activity of its three scientific teams range from the atmosphere to the most distant space: physico-chemistry of the atmosphere, physics of space plasmas, planetology to study the environment of planets and small bodies (e.g. comets) of the Solar System, pulsars and gravitation.

This research relies mainly on the scientific exploitation of instruments on board balloons, satellites or space probes. The LPC2E is one of the CNRS-INSU (Institut National des Sciences de l'Univers) space laboratories, working in close partnership with the CNES to propose, design, build and operate these instruments, then make their data and observations and publish the results available to the scientific community.





Dr Behzad Ataie-Ashtiani

LE STUDIUM Research Fellow

From: School of the Environment, Flinders University of Adelaide - AU

In residence at: French Geological Survey (BRGM) - Orléans

Nationality: Iranian

Programme: ARD 2020 PIVOTS

Dates: May 2021 to December 2021

Behzad Ataie-Ashtiani is an Associate Professor and Principal Research Fellow at the National Centre for Groundwater Research & Training, Flinders University (Australia). He has been Full Professor at the Water and Environmental Engineering section, Sharif University of Technology (SUT), Tehran, Iran since 2008. Behzad also worked as a Senior Research Fellow at GeoDelft and the Delft University of Technology, Delft, The Netherlands for 3 years. He has worked on a wide range of research problems concerning civil engineering. Most of the research involved numerical and experimental developments in managing surface and subsurface water resources quantity and quality. He has been listed among top 2% scientists ranking by Stanford University, 2020 and 2021. Moreover, he has published several papers on research integrity including world-wide analyses of publication retraction rates.

Behzad was the guest editor for a Special Issue of Journal of Hydrology and a Thematic issue of Landslides. Behzad has successfully supervised more than fifty research students, including 9 PhD students.



Dr Hossein Davarzani

Host Scientist

Hossein Davarzani is a research associate at the BRGM scientific and technical research center in Orléans. His research focuses on a combination of theoretical, numerical, and experimental approaches to study the coupled flow and transport phenomena in complex porous media. Quantitatively, in approximately 10 years of his career, he has published more than 26 articles in indexed journals. He co-supervised a number of Ph.D. students, master students, and postdoctoral fellows.



Dr Mohamed Azaroual

Host Scientist

Mohamed Azaroual from ISTO/BRGM has expertise in the reactive transport processes in hydrogeological multiphase systems and soil remediation techniques.

MODELING THE MULTIPHASE FLOW OF IMMISCIBLE FLUIDS IN HIGHLY PERMEABLE POROUS MEDIA FOR SOIL REMEDIATION

There is a number of objectives to this research: to strengthen the theoretical and modeling knowledge of the research team, to develop the Darcy-scale numerical models to study the multiphase flows in porous media as well as to use the simulation outcomes to help design and validate new experimental setup and protocol for the projects and identify missing measurements. Furthermore, the research also aims to use the PRIME and O-ZNS platforms as a frame to conceptualize and validate the developed model against the experimental and observatory results, while carrying out internationally outstanding research for the above-mentioned project. Finally, to disseminate this research through articles in journals of international standing, monographs, and other appropriate forms of dissemination, including national and international conference presentations, while supporting, complying with, and fully contributing to research plans and policies of the PRIME and O-ZNS teams.

Non-Aqueous Phase Liquids (NAPLs) are soil and groundwater contaminations, which remain undissolved or hardly dissolved in water. Physically and chemically, dissimilar fluids form interfaces among liquids and gas that prevent fluid mixing, and thus fluid flow in porous media is conceptualized as immiscible. Organic liquid contaminants such as petroleum oil, gasoline, or diesel fuel are frequent NAPL contaminations. Investigating, evaluating, and remediating the sites contaminated by NAPL is a challenging task. Exposure to even a small amount of pollution causes health and ecological risks to the environment. NAPLs are common soil and groundwater contamination in industrial countries. Remediation of contaminated sites by NAPLs is difficult and expensive, as NAPs are a long-term source of vapor, groundwater, and soil contamination in the subsurface zone. Numerical modeling of multiphase flow in the subsurface to address groundwater contamination by NAPLs and remediation was the core of this research project.

In the framework of his LE STUDIUM FELLOW award, Behzad Ataie-Ashtiani and his team developed a model based on the coupling of generalized Darcy's law and heat transfer equations to model a viscous dense non-aqueous phase liquid (DNAPL) pumping through highly permeable porous media under non-isothermal conditions. The presence of fingering and non-wetting phase ganglia was modeled through a dynamic capillary diffusion coefficient and an arbitrary heterogeneous permeability field. The model was validated using existing experimental data of a simple case oil injection in a 2D tank packed with glass beads. Considering a heterogeneous permeability field allowed to simulate the observed fingering and ganglia in the 2D glass beads tank. This issue opens a new perspective for further research on the use of heterogeneity to model the fingering at Darcy-scale.



Dr Barbara Cavalazzi

LE STUDIUM / Marie Skłodowska-Curie Research Fellow

From: University of Bologna - IT

In residence at: Center for Molecular Biophysics (CBM) - Orléans

Nationality: Italian

Programme: SMART LOIRE VALLEY

Dates: October 2020 to October 2021

Barbara Cavalazzi is an Associate Professor at the University of Bologna, Italy and Adjunct Professor at the University of Johannesburg, South Africa. She is a geobiologist/astrogeologist, expert in biosignatures preserved in rocks and a reputed field geobiologist. In 2008, she received the NASA-NAI and Lewis and Clark Fund for Exploration and Field Research in Astrobiology Award. In 2017, she received the Medal of Science from the Alexandria University, Egypt. In 2016 and 2020, she joined the scientific board of the Institute of Advanced Studies and of the Collegio Superiore of the University of Bologna, respectively. In 2020 she was a member of NASA-ESA Mars Sample Return Science Planning Group Phase 2 and of the International Mars Exploration Working Group. At the moment, she is involved in the Europlanet-H24 RI EU project and in the Pan-African Planetary and Space Science Network of the Intra-Africa Academic Mobility Scheme. She has been the president of the European Astrobiology Network Association – EANA since 2019.



Dr Frances Westall

Host Scientist

Dr. Frances Westall, geologist and astrobiologist, is the Director of Research at the CNRS-Centre de Biophysique Moléculaire. Her multidisciplinary scientific career encompasses geology, planetology, geomicrobiology, prebiotic chemistry, and astrobiology. She is internationally renowned for her research on the geological context of the origin of life and the earliest traces of life on Earth. She was part of the science definition team that led to the ExoMars 2022 mission to search for life on Mars. Co-PI of the microscope CLUPI and Co-I on other instruments; she is the main biosignatures expert for the mission. She has been the president of the CNRS GDR Exobiology, president of the European Astrobiology Network Association, chair of the COSPAR Panel on Exploration and a member of numerous national and international committees – including the CNES Comité de Programmes Scientifique, the H2020 Space Advisory Group, the ESA Human, Exploration and Science Advisory Group, the ESA Space Science Advisory Group and many others. She has received the Medal of the Italian Chemical Society (2013), the Alfred Dumont Medal (Belgium), and was awarded an Honorary Fellowship of the International Studies Institute, Bologna as well as numerous awards from NASA.

ANALOGUES IN THE SEARCH FOR LIFE ON MARS

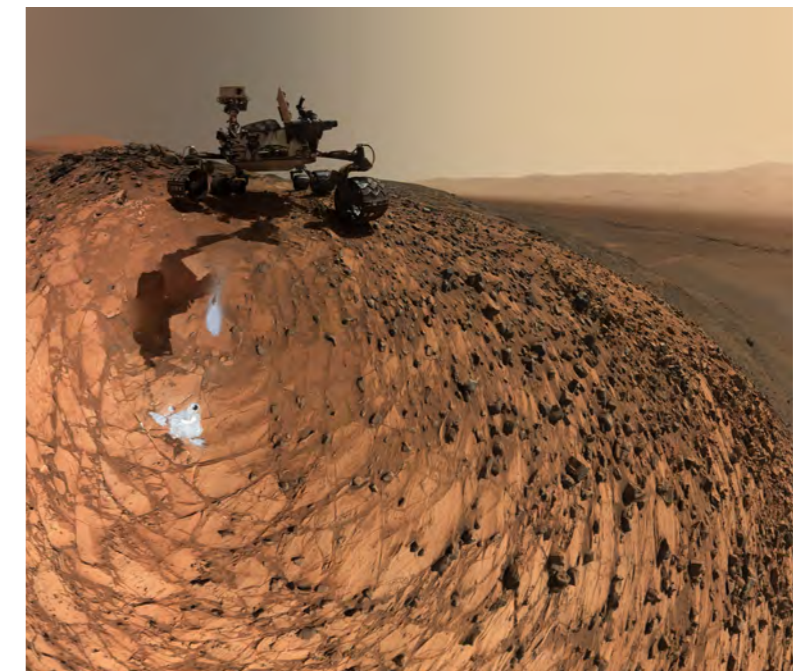
This project focuses on the search for traces of fossil life on Mars and related habitats, and is directly relevant for the forthcoming astrobiological missions to Mars.

Martian life is most likely to have been (and may still be) very primitive, leaving, at most, the fossil traces of organisms similar to terrestrial anaerobic microbes. Their biosignatures will be subtle, diluted by a mineral matrix, and easily confused with abiotic bacteriomorphs. Thus, criteria that can aid distinguishing bacteriomorphs from bona fide microbial fossils is of prime importance in the run-up to the missions for scientific testing of the payload instruments. Furthermore, being able to reconstruct field geobiological analogues for Mars will help in detecting rocks with a high fossilization potential.

The main target of this project is to compile a comprehensive catalogue or book including Mars-analogue environments and a broad range of biosignatures of relevance to Mars. There are many studies concerning different types of Mars analogue organisms and there have been some previous generalisations regarding biosignatures on Mars, but what is lacking, at this very critical stage in the lead-up to the Mars missions is a comprehensive catalogue of Mars-analogue environments and of biosignatures of relevance to Mars. Such work will be of use especially to those directly involved in the search for Martian life, from students (who will be the next generation of astrobiologists and planetary scientists) to established scientists.

Within this timely, space mission context, there are two main objectives in this project. First, to study biosignatures from carbonates cropping out in the Djiboutian area of the Afar depression, an analogue for the surface of Mars during the Noachian/Hesperian eras (~4-3.5 Ga); Second, the team will create a catalogue of Mars-relevant terrestrial analogues and biosignatures – in the form of a review article and a photographic textbook –, for which there is an urgent and timely need to help prepare the scientists involved in the Mars 2020 and ExoMars 2020 missions.

To date, in collaboration with Dr Westall, data from the samples from the Djibouti area have been acquired and the related paper is in progress. A paper on biosignatures has also been published, and the "Planetary Filed Analogues" book project has been discussed with the Springer Editions; the project will start soon.





Dr Jean-Paul Vernier

LE STUDIUM Visiting Researcher

From: NASA Langley Research Center, National Institute of Aerospace - USA

In residence at: Laboratory of Physics and Chemistry of Environment and Space (LPC2E) - Orléans

Nationality: French

Programme: SMART LOIRE VALLEY

Dates: November 2021 to January 2022

Dr. Jean-Paul Vernier earned his PhD from the University of Versailles (France) in 2010 using balloon-borne measurements and satellite observations to investigate the distribution and properties of aerosols in the stratosphere. His research relied on developing retrieval algorithms to study volcanic aerosols using satellite sensors. From 2010 to 2012, Dr. Vernier was awarded a NASA postdoctoral fellowship at NASA Langley Research Center (Hampton, VA, United States). He discovered the Asian Tropopause Aerosol Layer, a new phenomenon linked to the transport of Asian Pollution into the stratosphere. He has been employed by the National Institute of Aerospace since 2017 and studies the impacts of Natural Disasters and Pollution on atmospheric composition, air quality and climate. He received the 2013 H.J.E. Reid award for the most significant paper at NASA Langley. He has served as Science Principal Investigator of 6 NASA-funded international field missions since 2014 and is the current Principal Investigator of two NASA Roses projects. He is a member of the Committee on Earth Observing Satellites (CEOS) and co-chairs the SPARC-VolRes initiative. He was a contributing author of the fifth assessment report (AR5) of the Intergovernmental Panel on Climate Change (IPCC)



Dr Gwenaël Berthet

Host Scientist

Dr. Gwenaël Berthet is a specialist of chemical and physical processes in the stratosphere controlling the budget and the variability of the ozone layer through double competence consisting in using optical instruments onboard balloon-platforms and global chemistry-transport modelling. To that purpose, he is involved in the development of new instrumentation and organization of balloon campaigns. He deeply participates to the better understanding of stratospheric aerosols and their chemical/radiative impacts. He is the first to have quantified the impact of a volcanic eruption of moderate amplitude (i.e. ~20 times less sulfur injected than a major eruption like the one of Pinatubo in 1991) on stratospheric ozone and has shown for the first time the role of co-injected volcanic halogens and sulfur on the formation of stratospheric aerosols.

IMPACTS OF POLLUTION, VOLCANOES AND WILDFIRES ON THE EARTH'S MIDDLE ATMOSPHERE

The Earth's surface temperature has risen by ~1.5°C since the industrial era due to the continuous influence of anthropogenic activities and the release of greenhouse gases in the atmosphere. Over the same period, particulate matters also known as "aerosols" emitted either through human activities (e.g. soot from transportation and power plants) and natural sources (dust, volcanic ash, sea salts) also affected the Earth's climate system. This project aims to study the properties of aerosols in the middle atmosphere using satellite observations, balloon-borne measurements and numerical simulations. Jean-Paul Vernier and his team plan to simulate their behaviors using state-of-the-art aerosol transport models to understand how they affect solar radiation, ozone chemistry and identify main sources and transport pathways. In addition, they plan to analyze balloon-borne measurements obtained during several field campaigns in India since 2015 to test if model simulations can reproduce the vertical extent, observed aerosol size distributions, and other chemical properties of Asian Pollution. Finally, they aim to develop additional aerosol sensors to gather new information on the chemical, physical and optical properties of aerosols transported in the stratosphere. The team's research work will focus on the aerosol content at high altitudes (upper troposphere and stratosphere). It will give decision makers and government in Asia scientific basis to explain how upper atmospheric pollution could harm the Earth's climate system, stratospheric ozone and alter precipitation. In addition, the alarming increase of extreme wildfires affecting not only people on the ground but with global implications because of smoke transport in the stratosphere is extremely concerning. Their research work, focusing on how wildfires can harm stratospheric ozone and potentially affect the Earth's climate is extremely important to understand climate changes.

Since the beginning of the LE STUDIUM Visiting Researcher award, in November 2021, the team's work focused on field deployments to study atmospheric aerosols using balloon-borne observations. Through a collaboration between the LPC2E, the Groupe de Spectrométrie Moléculaire (GSMA) and the National Institute of Aerospace/NASA Langley Research Center, 12 balloon flights were conducted under the Radiosounding of Extreme events and Aerosols in the Stratosphere (REAS). Using optical particle counters and other payloads, they characterized the vertical distribution of atmospheric aerosols and Trace Gases. They identified the influence of volcanic plumes from La Soufriere eruption and likely smoke from extreme wildfires. They characterized the optical properties (backscatter) using a lightweight backscatter sonde. Finally, two balloon-borne lightweight systems were developed and tested to sample stratospheric aerosols for laboratory analysis. The 7-week campaign deployment in Reims constitutes the major achievement of this fellowship with the development of new sensors and flight systems which provided unique measurements of stratospheric aerosols.



Dr Philippe Rozenberg

BioFora INRAE

Philippe Rozenberg is a Research Director at INRA Val de Loire, Orléans. he got a Master in ecology from the Paris VI University, a PhD degree on Forest Sciences from AgroParisTech (Paris) and an Habilitation degree from the University of Orléans. He is a research director at INRA Val de Loire, Orléans, the leader of the "genetic and Physiology of Adaptation" team of the research unit BIOFORA and a member of the INRA national scientific council. He develops a research program on "adaptation of forest trees to climate" in natural as well as in artificial forest tree populations. In this context, he investigates the evolutionary adaptation and the phenotypic plasticity of forest trees using tree- ring analysis and wood formation studies. He coordinated more than ten national and international research projects, directed eight PhD thesis and published more than sixty research articles in international scientific journals.

INTRODUCTION, BREEDING, PROPAGATION AND DEPLOYMENT OF PACIFIC NORTHWEST CONIFERS AROUND THE WORLD: 70 YEARS OF PROGRESS, OPPORTUNITIES AND CHALLENGES

The Online conference of the IUFRO group 2.02.05 "Pacific NorthWest Conifers", broadly dealt with the genetics of conifers originating from Pacific North-West (PNW) North America. With the exception of a possible keynote presentation or two on general tree breeding topics, all presentations were about a PNW conifer. There remains interest in introducing PNW conifers as exotics, as well as establishing new provenance tests, with added motivation from climate change. There are places where PNW conifers seem to add little value. The most advanced programs are in the 4th cycle of breeding and testing. Large seed orchard programs are in place for some species. Genomics, other molecular genetics efforts, and one somatic embryogenesis program were described. Foundational functions such as cone and seed processing should not be neglected. Disease resistance programs have made excellent progress with resistant seed being used for several PNW species - and the programs show a path forward to others. The conference was attended by 110 people; 30 oral presentations and 14 posters were presented, while a book of abstracts was edited and distributed. The conference was co-organized by the MiDi (Habitats & Diversity [Milieux & Diversité]) network, and LE STUDIUM Loire Valley Institute for Advanced Studies, which was also the host of the conference. The organization committee was made up of eight people from five countries. Brian Baltunis (Weyerhaeuser Company), Keith Jayawickrama (Oregon State University), Rich Snieszko (United States Forest Service) and Terrance Ye (Oregon State University) are all from the United States. Silvio Schueler (Federal Research and Training Centre for Forests, Natural Hazards and Landscape) and Marcela von Loo (Federal Research and Training Centre for Forests, Natural Hazards and Landscape) both come from Austria, while Jaroslav Klaptse (Scion), Philippe Rozenberg (INRAE) and Nick Ukrainetz (British Columbia Ministry of Forests, Lands, Natural Resources, Rural Development) respectively represented New Zealand, France and Canada.





Dr Illia Zymak

LE STUDIUM / Marie Skłodowska-Curie
Research Fellow

From: J. Heyrovský Institute of Physical Chemistry - CZ

In residence at: Laboratory of Physics and Chemistry of Environment and Space (LPC2E) - Orléans

Nationality: Ukrainian

Programme: SMART LOIRE VALLEY

Dates: January 2020 to August 2021

Before starting his Le STUDIUM fellowship, Illia Zymak worked as a postdoctoral scientist at the Laboratory of Mass-spectrometry, Heyrovsky Institute of Physical Chemistry, in Czechia. The main focus of his research was a study of chemical processes in the atmosphere of the Earth, other planets and moons of the Solar System (e.g., Titan, Mars). It was also the study of both the physical and chemical processes in low-temperature (down to 11 K) plasma relevant to astrochemistry. Illia Zymak has numerous publications in highly ranked (Q1) journals. I. Zymak works on building new laboratory experimental setups and research stations, from scratch to the commissioning. He has taken active part in organizing international conferences and has had a few scientific stays in different French laboratories as a holder of three COST STSM grants. After his LE STUDIUM fellowship, Dr. Zymak acquired a senior scientist position at the ELI beamlines - International Laser Research Centre user facility in Czechia.



Dr Christelle Briois
Host Scientist

Christelle Briois is an associate professor (maître de conférences) at the University of Orléans, and a researcher at LPC2E in the Planetology team. She is Co-PI and Co-Investigator of several space instruments that have flown as COSIMA and ROSINA onboard the ESA/Rosetta cometary mission launched in 2004. The team worked on COSIMA, the mass spectrometer for analysis of dust in the environment of comet 67P/Churyumov-Gerasimenko (results are reported in Science, Nature etc.). Currently C. Briois is a scientific coordinator of the international Cosmorbitrap Consortium and a chair of its Comité Scientifique Orbitrap™ that has undertaken the development of a space-qualified analyzer of future HRMS space instruments based on the Orbitrap™, for in situ planetology applications. She is an International Co-PI in the NASA-led CORALS and CRATER projects. She is also contributing to preparation of the scientific interpretation of data that would be recorded by SUDA onboard the NASA/Europa-Clipper mission (expected launch in 2025, arrival 20's - 30's).

COSMORBITRAP - HIGH RESOLUTION MASS SPECTROMETER FOR SPACE APPLICATION

Scientific request on experimental techniques of unambiguous in-situ identification and quantitative analysis of chemical species in extra-terrestrial bodies has risen up after recent space missions. Space probes delivered to gas giant planets and their moons and small objects of the Solar System confirmed their complex, organics-rich chemical composition. However, the existing space-qualified instruments cannot provide high enough mass-resolution and required advanced chemical models to confirm detection of heavy organic species.

One of the objectives of the C. Briois group is to develop a space-grade Orbitrap™-based high-resolution mass spectrometer for future space missions. Two different in-house research instruments are operated in the laboratory as a part of the CosmOrbitrap project: a Laser ablation -CosmOrbitrap prototype (Lab-CosmOrbitrap) and the OLYMPIA (Orbitrap anaLYser MultiPle IonisAtion), a compact testbench with interchangeable ion sources. Briois' group is currently involved in two laser ionisation/desorption Orbitrap based mass spectrometer projects selected by NASA (CORALS and CRATER), as well as co-investigator in the Europa-Clipper NASA mission.

The present LE STUDIUM project aimed to evaluate parameters, propose a design and test ion sources for the Orbitrap™-based high-resolution mass spectrometers required for the in-situ sampling of solid, gas-phase and liquid materials required for CORALS, CRATER, and Europa-Clipper SUDA. Successful realization of the project has allowed to achieve these goals. For OLYMPIA, improvement of the setup allows to obtain new experimental data and to use the instrument in further projects, such as its merging with the LILBID instrument in Berlin (a more than one-year-long experimental campaign to obtain data for CORALS and CRATER). Deep modification of the Lab-CosmOrbitrap optics for the laser ablation (construction of a new steering 213 nm laser system) allows sampling of optically transparent samples over its surface (sample mapping). Improved instruments have been used to obtain essential calibration data for the CRATER and CORALS projects. Result of the project is also important for the future Czech SLAVIA CubeSat mission. Recently, mass resolution higher than 50 000 at m/z range 28 - 86 has been confirmed for OLYMPIA. This resolution is sufficient to complement databases with calibration data required for space applications. Measurements of the composition of gas mixtures representing planetary environment and real solid samples of the Moon (meteorite fragment) have been performed.

The potential discoveries expected with such High Resolution Mass Spectrometer instruments may change our current understanding of chemical history of the Solar System and the habitability zones, and redefine their limits. This technology is essential for the identification of biosignatures (e.g., glycine in comets and phosphine recently detected - although yet a controversial result - in the atmosphere of Venus).

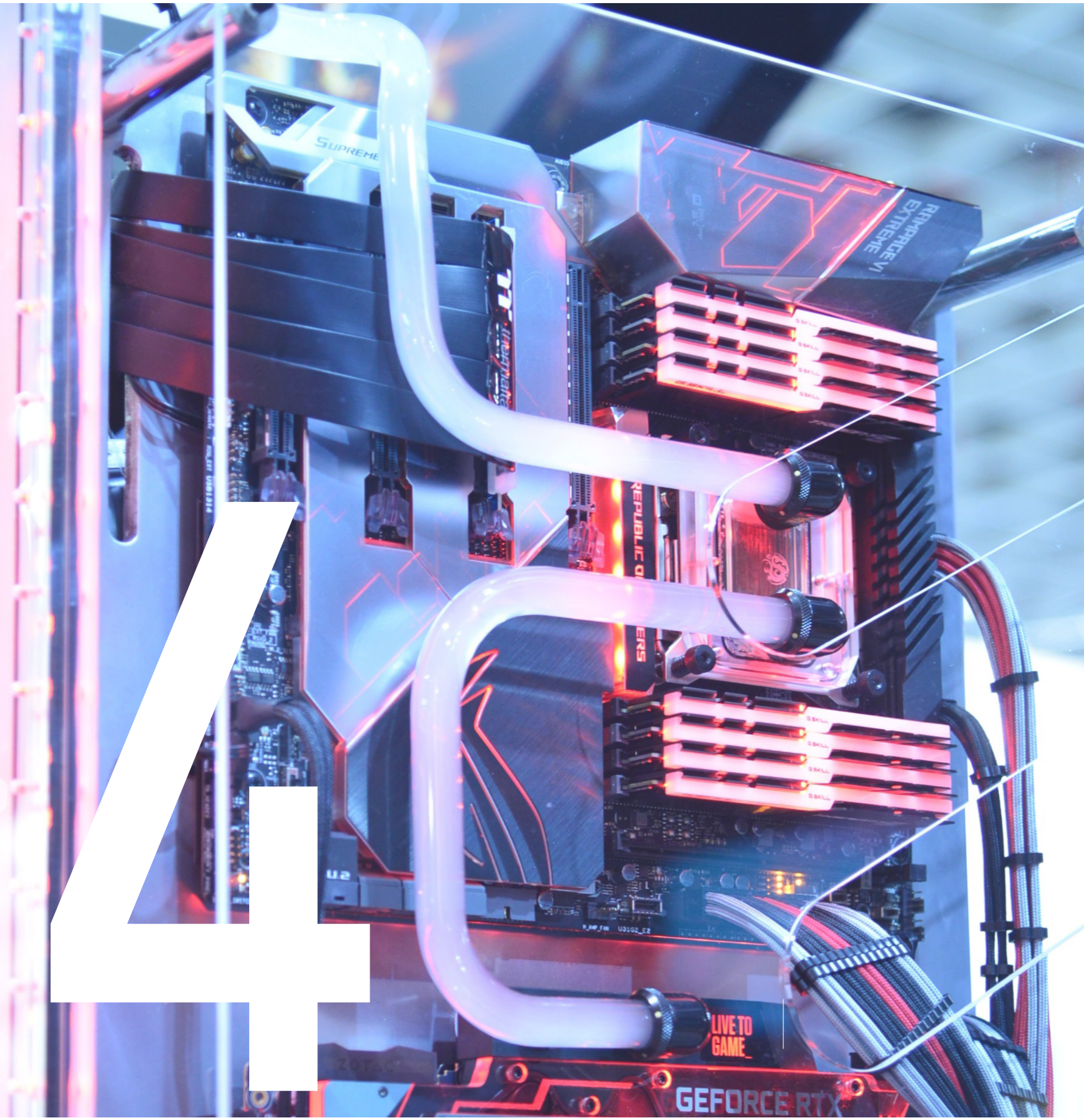


Dr Behzad Ataie-Ashtiani

- Ataie-Ashtiani, B. Some Insights about the Lake Urmia (Iran) crisis and restoration plan, Invited presentation at Institute Earth and Environment, the Strasbourg University, 19th November 2021 <https://ites.unistra.fr/agenda/evenement/m-behzad-ataie-ashtiani>
- Ataie-Ashtiani, B. Groundwater contamination by Non-Aqueous Phase Liquids (NAPL), LE STUDIUM Thursday Seminar, 2nd December 2021
- Ataie-Ashtiani, B. Planning without appropriate data and model is gambling: Lake Urmia crisis and restoration plan, Invited presentation at UMR METIS, the Sorbonne University, Paris, 3rd December 2021
- Shafabakhsh, P.; Ataie-Ashtiani, B., Simmons, C. T., Younes, A.; Fahs, M. Convective-reactive transport of dissolved CO₂ in fractured-geological formations; International Journal of Greenhouse Gas Control. Volume 109, July 2021, 103365

Dr Illia Zymak

- Zymak, I. et al. Presentation at the international EGU conference, 2021.
- Zymak, I.; Sanderink, A.; Gaubicher, B.; Žabka, J.; Lebreton, J.-P.; Briois, C. OLYMPIA - A compact laboratory Orbitrap-based high-resolution mass spectrometer laboratory set-up: Performance studies for gas composition measurement in analogues of planetary environments, In EGU General Assembly Conference Abstracts., pp. EGU21-8424, 2021.



COMPUTER SCIENCE, MATHEMATICS & MATHEMATICAL PHYSICS

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INSTITUT DENIS POISSON (IDP)
UPR 7013 - CNRS, UNIVERSITÉ D'ORLÉANS,
UNIVERSITÉ DE TOURS



The Institut Denis Poisson (IDP) was created in 2018, bringing two laboratories together: the Laboratory of Theoretical Physics and Mathematics (LMPTP), located in Tours, and the Laboratory of Mathematics (MAPMO) located in Orleans.

The IDP is a multidisciplinary laboratory with mathematicians and theoretical physicists working in a large variety of fields. It is well known for its high standard works in gravitational physics, quantum field theory, Riemannian geometry and dynamical systems.

The IDP in Tours consists of 42 professors and lecturers and 7 CNRS researchers (4 Chargés de Recherche and 3 Directeurs de Recherche). The administrative and technical support is provided by 3 secretaries, 1 librarian and 2 technicians. It is responsible for teaching within the Master programs «Fundamental physics and applications» (M1), «Non-linear models in Physics» (M2).



Dr Erida Gjini

LE STUDIUM Visiting Researcher

From: Mathematical Modelling of Biological Processes, The Gulbenkian Institute - PT

In residence at: Institut Denis Poisson - Tours

Nationality: Portuguese

Programme: SMART LOIRE VALLEY

Dates: March 2021 to July 2021

Erida Gjini is a mathematical biologist, working on infectious disease dynamics, ecology, and evolution. During her PhD (2007-2012) she trained in mathematical biology, focusing on parasite infection dynamics and antigenic variation, followed by a postdoc (2012-2015) where she worked in mathematical epidemiology. As an independent PI at the Gulbenkian Institute, Portugal (2015-2020), she developed a unique program, researching antibiotic resistance management, host immunity, and microbial ecosystem dynamics under cooperation and competition. Her research, currently based at the Instituto Superior Tecnico in Lisbon, Portugal, applies a variety of methods from dynamical systems, Bayesian inference, optimization, probability theory, networks and microbial genomics. Her goal is to understand mechanisms, principles, and evolution of biodiversity and biocomplexity in a range of living systems (29 papers, Google h-Scholar 10, with 262 citations since 2016).

Through an interdisciplinary and exceptionally international background (UK, Netherlands, Italy, France, USA), she has developed outstanding scientific research in mathematical biology and many collaborations. She teaches mathematical and computational biology at Bachelor, Master's and PhD levels. She reviews for many journals, national grant programs and for the European Commission. She promotes mathematics in biology, women in science, and public outreach.



Dr Sten Madec
Host Scientist

Sten Madec holds a PhD in Mathematics (2007-2011) from the University of Rennes in France and he is currently Assistant Professor at the University of Tours, member of the Laboratoire de Mathématiques et Physique Théorique, University of Tours. He conducts research in Analysis and Applied Mathematics, working in a variety of areas involving dynamical systems, singular perturbation theory, chemostat dynamics and ecological applications (>18 papers). He teaches mathematics and related subjects (operational research, scientific computation, numerical analysis, etc.) at the University of Tours, has supervised Master students and co-supervised two Phd students, and organizes workshops and scientific events in Mathematical Biology in Orleans and Tours. Sten is a strong promoter of public communication of science and mathematics.

COEXISTENCE NEAR NEUTRALITY

Erida Gjini and Sten Madec are developing a new mathematical analytical framework to study N-strain dynamics, where trait variation leads to different collective coexistence and diversity-stability regimes. They extended their initial approach focusing on co-colonization interactions as stabilizing force in endemic multi-type ecosystems, to include variation along more traits. Mathematical modeling and analysis, conducted by PhD student Thi Minh Thao Le, in co-supervision, has led to derivation of a general replicator equation that allows to predict N-strain coexistence under more complex and realistic scenarios. These results advance fundamental challenges in mathematical ecology by enabling high-resolution temporal predictions for multi-strain interacting systems with coinfection. Their framework can apply to other multi-type contagion systems in ecology, sociology, information propagation systems, where frequency-dependent dynamics between co-circulating types are important. Besides the completion of the PHD thesis of their student, they have submitted two more papers in 2021 as a result of their work.





Prof. Sergey Solodukhin

CONSORTIUM COORDINATOR



Sergey Solodukhin is a professor of physics (classe exceptionnelle since 2018) at the University of Tours. He is a world class expert in the field of theoretical high energy physics and gravitation. He is an author of about 90 papers with more than 6000 citations. Among many other things he has established, in a 2008 paper, a fundamental relation between the conformal anomaly and the entanglement entropy, known in the literature as Solodukhin's formula.

EXPLORATION OF DUALITY, GEOMETRY, AND ENTANGLEMENT (EDGE)

The aim of this consortium is to bring a European group of experts together to discuss and work on the recent developments in the rapidly growing field lying in the intersection of geometry, quantum field theory and duality, to help grow a research effort in this fast moving area. Our goal is to coordinate the international efforts and generate new ideas. We intend this small initial collaboration to grow into something larger in the near future.

As of the end of 2021, the Consortium has organized two meetings. The first meeting took place online between 2nd-5th June 2020. The meeting was very successful, all members and collaborators of the consortium gave presentations. Some extra participants (outside of the consortium) also attended the on-line meeting.

The second meeting took place between 13th-17th December 2021. It was originally planned as an in-person meeting. However, due to the situation in Europe caused by the pandemic, it eventually took place as a hybrid event. Some members of the Consortium were able to come to Tours and participate in-person, while the others actively participated via Zoom. Several French scientists from ENS, Paris were also invited to participate and attended in-person. The meeting was generally successful and resulted in fruitful scientific exchange between the participants. Even in this hybrid form the second meeting was a very positive scientific event, one of very few partially in-person meetings organized in France in 2021.

PARTNERS



Prof. Jan De Boer

brings his expertise in many geometrical aspects of the holographic duality between string theory and gravitational physics.

University of Amsterdam -
Netherlands



Prof. Manuela Kulaxizi

brings her expertise in the conformal field theory (CFT) and in establishing the relations between the CFT and black holes.

Trinity College - Ireland



Prof. Gary Gibbons

brings to the consortium his unique expertise, at the intersection of in gravitational physics, physics of black holes, string theory and mathematical physics.

DAMTP, Cambridge - United
Kingdom



Prof. Christopher Herzog

expertise in string theory, holographic duality and condensed matter plays a key role in the consortium's efforts; he assists the general coordination of the consortium's activities.

King's College - United Kingdom



Prof. Erik Tonni

brings his experience in the applications of the methods of the conformal field theory to various statistical models, holographic computations of the entanglement entropy via the minimal surfaces in the anti-de Sitter space-time.

International School for Advanced
Studies (SISSA) - Italia



HUMAN & SOCIAL SCIENCES

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CENTRE D'ÉTUDES SUPÉRIEURES DE LA RENAISSANCE (CESR) UMR 7323 - UNIVERSITÉ DE TOURS, CNRS



The Centre d'Études Supérieures de la Renaissance (CESR) was founded in 1956 through the initiative of Gaston Berger. It is a training and research center, where fifty researchers and about fifty doctoral students are committed to the study of the Renaissance in Europe, from Petrarch to Descartes and, thanks to numerous collaborations, to the study of heritage, mainly in the Loire Valley. It has developed research on Digital Humanities (e.g. the Database RENUMAR: De minute en minute 2.0) and on the different aspects of Heritage (through the ARD "Intelligence des Patrimoines", with the Program "Gastronomy, Health and Well-Being"). In accordance with its dual scientific and educational vocation, it has obtained over the course of its history the dual status, unique in France, of training and research unit of the University of Tours and joint research unit under the triple supervision of the University of Tours, the National Center for Scientific Research and the Ministry of Culture. The CESR is organized on a multidisciplinary basis which allows it to be structured around seven research fields: «History», «History of Art», «History of Science», «French and ancient literature», «European literature» «and» Musicology «and» Philosophy «.

Continuing the tradition of the "humanist studies internships", the CESR organizes an international colloquium on humanist studies at the beginning of every summer, as well as study days, thematic schools, conferences and workshops throughout the year. The CESR has a proven track record of continuous international collaborations, benefitting from specialist staff and specific equipment used for digitization projects.



INTERACTIONS CULTURELLES ET DISCURSIVES (ICD) EA 6297 - UNIVERSITÉ DE TOURS



The interdisciplinary research unit Interactions Culturelles et Discursives (ICD, EA 6297) was created in 2012 with the merger of four groups belonging to the Letters, Languages and Human Sciences sector and grouping colleagues from two faculties (Letters & Languages, and Arts & Human Sciences). The new entity allows the collaboration of academics working in different departments such as Anglo-American Studies, Spanish, Ibero-American and Portuguese Studies, Law and Languages, Ancient and French literatures, Philosophy, etc.

The programme for 2018-2023 is entitled 'Liberties' and, in the wake of the previous programme ('Paradigms of authority' - 2012-2017), it deals with the description and analysis of forms of liberty, and the times/places where liberty was/is in crisis, in the various fields of the arts, literature, and social and political life. It is devised around three main research axes:

- 1) Culture and politics, colonial and postcolonial studies: the politics of cultural and national diversity, subversion of the norm and creation of the possible, postcolonial modernities and transformations in/of culture;
- 2) Writing and other discursive practices: liberty and censorship or esthetic constraint, creation and interpretation (literature, music, theatre, cinema), translations and cultural transfer;
- 3) Constructed and deconstructed identities, genders: popular and mass cultures, re-reading of «gender discourses», representations of the body and environmental humanities.

While never renouncing the specificities of academic research corresponding to the sections inherent to the French university system, the group encourages transdisciplinary studies. All of the axes are characterized by convergences in the problematics contemplated and researchers may move freely between them. The members of the group may thus work along several axes.



RÉMÉLICE (RÉCEPTION ET MÉDIATION DE LITTÉRATURES ET DE CULTURES ÉTRANGÈRES ET COMPARÉES) EA 4709- UNIVERSITÉ D'ORLÉANS



The RÉMÉLICE laboratory, founded in 2012, brings together lecturers/researchers and doctoral students working in the fields of arts, letters, languages, and humanities from an international perspective, with a particular interest in the study of language-culture and the notion of cultural transfer. Its members study the English-speaking world, Spain, Latin American countries, Japan, China as well as the French-speaking world, often through a comparative focus. The laboratory is a member of the Federation for the Study of Contemporary Civilizations, as well as of the ALMOREAL Network, which works on cultural exchanges and crossed perspectives between Hispanic and Hispano-American worlds. The laboratory seeks to go beyond disciplinary, national, or linguistic partitions, to study the different forms of cultural transfer that exist (links between various forms of art or artistic expression from the visual to the written word, studies on translation and its evolution, intercultural approaches in education, in the world of work, etc., relations between media and politics or media and history).. Its members are also interested in all related questions that concern the relationship with others, the very notions of «foreign» or «foreignness», cultural heritages, choices of culture / language / society, by considering their transfers / transformations in an international context.



POUVOIR, LETTRES, NORMES (POLEN) EA 4710 - UNIVERSITÉ D'ORLÉANS



POLEN's areas of research revolve around the issues of power and authority in their different forms (political power, religious authority, social practices, cultural, literary and artistic models, legal frameworks and judicial norms). It addresses their different modes of expression, representation and diffusion (texts, images and all forms of symbolic and artistic production). In contrast, these topics raise questions of contestation, subversion and marginality. This general project is addressed in particular ways by the different component research groups, according to their particular focus and the research fields of their members.

Teams of POLEN :

- CESFIMA : Centre for Research into the Late Middle Ages : the construction of norms and models by centres of authority and learning ; the diffusion, contestation and reconstruction of knowledge, norms and models.
- CLARESS : From the Classical Age to the Restoration of the French Monarchy: private and public practices of writing and reading; writings of the inner self; authority and the written word; interaction of the public and the private in written practices.
- CEPOC : Centre for Contemporary Political Studies: types and norms of political discourse; social and cultural connections between literature and politics; memory and its written expression; non-discursive political writing (images, rituals, ceremonies).

POLEN is a member of the Human Sciences Loire Valley's Home.





Dr Raphaël Cahen

LE STUDIUM / Marie Skłodowska-Curie
Research Fellow

From: Contextual Research in Law (CORE),
Vrije Universiteit Brussel - BE

In residence at: POUvoirs, L'États,
Normes (POLEN/CEPOC) - Orléans

Nationality: French

Programme: SMART LOIRE VALLEY

Dates: September 2020 to October 2021

Raphaël Cahen is a Post-doctoral Fellow as well as a visiting professor in Legal History at the Vrije Universiteit Brussel (VUB). He has studied law, history and political sciences in Aix-en-provence, Perugia and Munich, and holds a Joint PhD in Law and political sciences from Aix-Marseille University and the LMU Munich (Prize Montesquieu AFHIP 2017, 2th Best PhD Prize of AHFD 2015, AMU Prize Peirecos for the best international PHD). He was awarded an FWO Incoming Pegasus Marie-Skłodowska Curie Fellowship (2017-2019) and has been teaching a Master's course on the history of International Law at the VUB (2018-2021). He is doing research on intellectual history, as well as history of institutions and international law. He is co-supervising the PhD thesis of Wouter de Rycke on "The Legal Construction of Peace before 1870. Networks and Arguments" for which he has been co-awarded an FWO Junior Fellowship Research Project (2020-2024).



Prof. Pierre Allorant
Host Scientist

Contemporary Historian for Political Studies, Professor Pierre Allorant is also a Lawyer, and has been the Director of the Law, Economy and Management unit of formation and research at the University of Orléans since 2016. His work focuses on the French prefectorial corps, municipalities, and the relationship between the Minister of internal affairs and the departments and regions since the French revolution. He has published several books on War memories, letters, private papers, and representations. One of these books deals with the "Lieux de mémoire" in the Loire Valley and Berry. Furthermore, he is investigating the French administration and the questions of centralisation and decentralisation. He has studied the foundation of Compared Legislative Society, the first French "think tank" founded in 1869, at the end of the Second Empire.

SOCIOLOGICAL AND CULTURAL HISTORY OF INTERNATIONAL LAW (1815-1871)

It was recently observed that the jurists involved in the Austrian foreign affairs ministry from 1815 onwards had not been studied (Gruner, 2017). The same can be said about international lawyers in France, one of the most important cases involving jurists is, of course, the question of indemnities that France had to pay after the Treaty of 1815 and the occupation of the country (Haynes, 2018; De Graaf, 2020). But to get an insight in the cultural and sociological interaction between foreign affairs and international lawyers (in the French case), one must first study the office of "Legal Adviser" (Jurisconsulte du ministère des affaires étrangères) and then the litigation committee that was created in 1835. This five-member committee was established to deal with the growing number of cases after the Peace of 1815 (Cahen, 2019). Although mentioned in studies of the French foreign affairs ministry, this committee has not yet been studied (Baillou, 1984). Yet, its importance and the fact that its activities were growing, especially at the time of the Second Empire, were underlined (Bruley, 2012). The most recent research has also stressed its importance, but again for the period after 1871 (Rygiel, 2018). The foreign affairs archives contain extensive unpublished sources on the committee (about 500 boxes) that need to be explored: how was the committee organised? What types of cases did the committee examine the most? Were they mostly related to private or public International law issues? Who were the jurists involved in it? What were their networks and connections? As a first answer to these questions, it may be noted that most of the presidents of the litigation committee were jurists who had all emigrated and belonged to the same networks, as members of the Hauterive School of Diplomacy, as shown recently (Cahen, 2020).

In order to study the history of this committee, it is fundamental to do a prosopography (a collective study of the biographies) of it in line with the previous work carried out by the historian Christophe Charle about the professor of the faculty of humanities in Paris (1985-1986) or the professors of the Collège de France (1988). None of the first presidents are well known in the historiography. Neither Edouard Mounier (1784-1843), president from 1835 to 1837 – who was also in charge of the debt committee from 1815 to 1818 and a member of the French delegation at the congress of Aix-La-Chapelle – nor Joseph-Balthazard Siméon (1781-1846), president from 1837 to 1846 – who was both a diplomat and a jurist and whose private archive contains an unpublished manuscript about the "law of nations" (French National Archives, Fonds Siméon, 558 AP/4) – have been studied extensively to date. Regarding Joseph-Marie Portalis, president from 1854 to 1858, a conference proceeding has recently partially filled this research gap (Cahen, Laurent-Bonne, 2020).

This case study would also have a transnational and comparative dimension, as it aims to compare the French case with Belgium and Austria to see how jurists have been involved in foreign offices in these countries. Indeed, although juridical sections of foreign offices have mostly been created only after the First World War – precisely in 1919 in Belgium (Coolsaet, Dujardin, Roosens, 2014) and in Austria –, international lawyers were involved in foreign offices in the period 1815-1871 in the making of treaties. They were also involved in arbitration as well as in other legal cases concerning international relations, thus shaping the culture of international law (Genin, 2018; Matsch, 1986, Conze 2013; Bullen 1984).

LAW(S) AND INTERNATIONAL RELATIONS : ACTORS, INSTITUTIONS AND COMPARATIVE LEGISLATIONS

Seven sessions were held during the three days of the conference. The first one related to "Women and International Law", while the second one dealt with "International Law in Practice: Actors", the third one with "Slave trade, slavery and international law" while the fourth one was about "Western international law and global encounters". The fifth one treated "comparative legislation and private international law", the sixth one was about "international law in practice: institutions" and finally the seventh one dealt with "international law in practice: expertises and experts".

A book is in the works with the Editions Pedone, which will be bilingual (French, English). It will be formed of more than 25 contributions dealing with all historiographical aspects of the history of international law and will make an important contribution to this academic field.

Furthermore, within the conference, Milos Vec (University of Vienna) made an impressive inaugural conference on "how to write a western history of international law" and Stella Ghervas (University of Newcastle) a public lecture in French on "Conquérir la paix: des Lumières à l'Union européenne" with a large publicum and a vivid discussion afterwards.

And finally the conclusion was a third highlight and keynote by Pierre François Laval (Lyon) on "André Gros, et la fonction de jurisconsulte du ministère des affaires étrangères"

CONQUÉRIR LA PAIX : DES LUMIÈRES À L'UNION EUROPÉENNE

Political peace in Europe has historically been elusive and ephemeral. Stella Ghervas showed in her recently published book and during this public lecture that since the eighteenth century, European thinkers and leaders in pursuit of lasting peace fostered the idea of European unification.

Bridging intellectual and political history, Ghervas draws on the work of philosophers from Abbé de Saint-Pierre, who wrote an early eighteenth-century plan for perpetual peace, to Rousseau and Kant, as well as statesmen such as Tsar Alexander I, Woodrow Wilson, Winston Churchill, Robert Schuman, and Mikhail Gorbachev. She locates five major conflicts since 1700 that spurred such visionaries to promote systems of peace in Europe: the War of the Spanish Succession, the Napoleonic Wars, World War I, World War II, and the Cold War. Each moment generated a "spirit" of peace among monarchs, diplomats, democratic leaders, and ordinary citizens. The engineers of peace progressively constructed mechanisms and institutions designed to prevent future wars.

Arguing for continuities from the ideals of the Enlightenment, through the nineteenth-century Concert of Nations, to the institutions of the European Union and beyond, Conquering Peace illustrates how peace as a value shaped the idea of a unified Europe long before the EU came into being. Today the EU is widely criticized as an obstacle to sovereignty and for its democratic deficit. Seen in the long-range perspective of the history of peacemaking, however, this European society of states emerges as something else entirely: a step in the quest for a less violent world.





Dr Jean-François Deluchey

LE STUDIUM / Marie Skłodowska-Curie Research Fellow

From: Federal University of Pará - BR

In residence at: Cultural and Discursive Interactions (ICD) - Tours

Nationality: French

Programme: SMART LOIRE VALLEY

Dates: January 2020 to July 2021

Dr. Jean-François Deluchey is a political scientist, with a PhD in Political Science / Public Policies from the Sorbonne Nouvelle University (Paris 3). He is a Professor of Applied Social Sciences Institute / Faculty of Social Work/ Master and PhD of Law Studies/Master and PhD of Social Work in the Pará Federal University (UFPA). He was a postdoctoral Fellow in Law from PUC University (Rio de Janeiro) and in Sociology at Sophiapol / Paris-Nanterre University. He also leads the CESIP-MARGEAR CNPq research group (Study Group on Violent Normalizations of Lives in the Amazon). He is an active member of the GENA research network (Study Group on Neoliberalism and Alternatives, Laboratory Sophiapol, Université Paris Nanterre). His expertise lays in political science and sociology of law, especially critical theory, state theory, public safety and methodology of social sciences. In his research, he studies the following fields: criminal law enforcement system, neoliberal governmentality, public safety, police forces, state and political system, democracy, state management, Brazil and Amazonian Region. His current research concerns «the extermination of peripheral youth in the Brazilian Amazon region».



Dr Nathalie Champroux
Host Scientist

Nathalie Anna Champroux passed her Habilitation to Supervise Research in November 2017 and was appointed Professor at the University of Tours in September 2018. At the Faculty of Letters and Languages, her teaching mainly concerns British history and economic life. Her research focuses on British monetary policy since 1945 and she has worked extensively on the MTFs implemented by the Thatcher governments. At the University of Tours, she gathered a group of researchers of ICD and IRJI around the theme of the Anglo-American neoliberalism of the 1980s, its origins, characteristics and spread. She launched a monthly seminar (Le Libéralisme dans tous ses États) in January 2019 and proposed a two-day conference to be held in March 2021, for which her group was granted funding by the University Research Commission and the Region.

AT THE MARGINS OF NEOLIBERAL GOVERNMENTALITY: THE EXTERMINATION OF PERIPHERAL YOUTH IN THE BRAZILIAN AMAZON REGION

This project proposes to analyze and describe the phenomenon of the extermination of peripheral young people in Amazonia. It will try to discover to what extent these politics of death (thanatopolitics) constitute a structuring apparatus of the neoliberal governmentality, by operating a calculation of the value of the human in market-oriented terms, in an outermost region of the neoliberal capitalist order. This aim shall be complemented by the implementation of four specific aims:

1. Analyse, quantitatively and qualitatively, the phenomenon of "chacinas" (multiple killings), putting it in perspective with the national situation and the growth of lethal violence in the Amazon region during the 2010 decade;
2. Identify, in written media and sociological interviews, how certain discourses explain (and/or legitimize) the extermination of peripheral (black) youths in Brazil and the Amazon, as well as the process of social differentiation to which it is related;
3. Identify if there is, and through what modalities it is carried out in the Brazilian Amazon, a calculation serving as a basis for a social differentiation between, on the one hand, those who are useful to the market and deserve to live and, on the other hand, those who are useless and deserve to die or to be imprisoned;
4. Reflect on the relation between the phenomena under study (extermination of peripheral youth and neoliberal governmentality) and the concepts of life/survival/death, war, (ultra)periphery, marginality, value, human capital, precariousness, colonialism, biopolitics/thanatopolitics and racism.



Dr Francesca Fantappiè

LE STUDIUM Guest Research Fellow

From: Villa I Tatti, The Harvard University Center for Italian Renaissance Studies - IT

In residence at: Center for Advanced Studies in the Renaissance (CESR) - Tours

Nationality: Italian

Programme: MSCA INDIVIDUAL FELLOWSHIP

Dates: October 2021 to September 2023

Francesca Fantappiè is an historian of Theatre and Performing Arts. In 2018 she obtained the Italian National Habilitation as associate professor. Her publications cover all possible aspects of spectacle: text, music, dramaturgy, stagecraft and scenography, theatre architecture, performers, social, political and economic contexts (from Renaissance to Ancient Regime). She has extensive training in archival research, which in turn has given rise to noteworthy discoveries, and to such valuable publications as the book *Staging "Euridice" (1600): Theatre, Sets and Music in Late Renaissance Florence*, co-authored with Tim Carter (Cambridge University press, 2021). She curated the exhibition *Florence and the Birth of Opera: Documents and virtual reconstructions* (Florence, 2019). Her book *Per teatri non è Bergamo sito* (2010), offers an original picture of a city's society and mentality through the process of the architectural construction of its theatres. In 2019 she was co-organizer of the international conference *Florence Circa 1600: Patrician Families and the Financing of Culture*. In 2019-2020 she obtained a one-year Fellowship at the Villa I Tatti, Italy, with the project "The Economics of 'Meraviglia': Theatre, Music and Money at the Medici Court".



Prof. Philippe Canguilhem
Host Scientist

Philippe Canguilhem has been a Professor of Musicology (chercheur statutaire) at the University of Tours since September 2019 and is a senior member of the Institut Universitaire de France; he used to be a Professor of Musicology at the University of Toulouse. He was a fellow at Villa I Tatti (2005-2006) and at the Italian Academy of Columbia University (2013). He has supervised 7 PhD students and is currently working with 5. He was director of the ANR Fabbrica, project, on improvised counterpoint in the Renaissance. His scholarship is internationally recognized and focuses on the history of Renaissance music, and on the theory and practice of ancient music (vocal and instrumental, polyphonic and monodic), with particular attention to the performative context and the social status of musicians and singers. He has edited three volumes and he is author of numerous articles and chapters of collective books, 1 double CD, and audio resources on the Web. He is a member of three editorial boards of internationally accredited music magazines (Recercare, Epitome musical, Revue de musicologie).

FINANCING FESTIVALS, MUSIC AND THEATRE: REAL EXPENSES AND FICTIONAL EXPENDITURES IN FRANCE BETWEEN THE SIXTEENTH AND SEVENTEENTH CENTURIES

This research is an EU-funded SPECTACLEECONOMICS project (H2020-MSCA-IF-2020 - Marie Skłodowska-Curie Individual Fellowships 2021-2023) which investigates the financing and economic realities of civic and court festival productions in early modern France. This interdisciplinary survey aims to shed light on an often-disregarded aspect of the history of theatre and music, since there is still no specific, systematic research that has dealt with quantifying the expenditure on such ephemeral cultural activities that could themselves be the subject of both blame (as a wasteful use of time and money) and praise (propaganda in favor of the sovereign, the state and civic communities). The conventional view of festivities as a case of lavish conspicuous consumption is often supported by one set of sources reporting on it, such as printed descriptions, diary entries, letters, and so forth. But the information contained within these documents is usually determined by their function (official propaganda) or its sources (hearsay and gossip). Financial accounts, however, often present a different picture wherein expenses are carefully controlled and subject to prudent budget management. The results of this pioneering research will make a further step towards a comprehensive study of the economics of spectacle at a transnational and European level.

Since during the last two years (due to the current Covid-19 situation) the cultural sectors of performing arts (music and theatre) have been often disregarded by the politics, among the goals of the project there is also the dissemination of the scientific results at a general level – both with online digital communication to broadcast the results in an accessible and informative way on the web, and through social media – in order to contribute to the debate on the need to finance the performing arts in contemporary society.

During the Fellowship the following events are planned:

a) a panel at the annual meeting of the Renaissance Society of America (RSA) on female patronage and women producers (co-organized with Amy Brosius for the Dublin 2022 congress). This event will be followed by an online roundtable at RSA on the same topic (December 2022) and, hopefully, will be supplemented by a concert with the Maîtrise of at CMBV (a voice program specialized in early music) in autumn/winter 2022.

b) a conference at CESR (spring-summer 2023) with proceedings (provisional title: *Financing Spectacle and the Performing Arts Professions in Italy and France (1550–1650): The Necessity of Extravagance*) on music and the performing arts between the sixteenth and seventeenth centuries, focusing on the issues of social and economic contexts, prestige and social mobility (including a concert co-organized with Philippe Canguilhem).

The fellow will also produce a monograph with the provisional title *The Economics of Spectacle between Paris, Florence and Lyon: A Comparative Study (1550–1650)*, and she will submit at least three articles to peer-reviewed academic journals.



Dr Cynthia Gabbay

LE STUDIUM Research Fellow

From: Université d’Humboldt - DE

In residence at: RÉMÉLICE (RÉceptions et MÉdiations de Littératures et de Cultures Étrangères et comparées) - Orléans

Nationality: French

Programme: SMART LOIRE VALLEY

Dates: November 2021 to November 2022

Cynthia Gabbay is a Studium 2021 Fellow Researcher at the University of Orléans and an Associate Researcher at Centre/Zentrum Marc Bloch Berlin (HU). She is also a member of the international research group “The Impact of the Spanish Civil War in the Intellectual Life of Spanish America” at Universidad Complutense de Madrid. She has a PhD in Latin American and Romance Studies from The Hebrew University of Jerusalem (2012), and has completed several postdoctoral research stays in Jewish Studies both in Israel and Germany, where she was awarded an Alexander von Humboldt fellowship. She coordinates the online series “Simania: Salon Readings” (LAJSA), where she also serves in the Board of Directors. Moreover, she is a coeditor of the scientific journal *Lingua Franca* (SHARP). Based on her PhD (2012), which was awarded the Kirtchuk Prize in Latin American Studies, her first book was published as *Los ríos metafísicos de Julio Cortázar: de la lírica al diálogo* (Hispanérica/Eduvim, 2015). Her edited volume, *Jewish Imaginaries of the Spanish Civil War: In Search of Poetic Justice* is in press (Bloomsbury, New York, 2022). Cynthia Gabbay’s fields of interest are semiotics, translation studies, Jewish languages, popular culture, and poetry.



Dr Brigitte Natanson

Host Scientist

Brigitte Natanson holds a doctorate in Ibero-American Studies (University of Rouen Haute-Normandie) with a doctoral thesis on immigration to Mexico, where she lived for 3 years. She holds an authorization to supervise research (Habilitation à diriger les recherches or HDR) on the literature of immigration in Latin America. She is currently Emeritus Professor within the Letters, Languages and Human Sciences department of the University of Orléans, member of the EA 4709 research unit. She has translated works by Alfonso Reyes and José Martí, as well as published in international and national journals on immigration literature, Latin American theater, translation and women in Latin America in the 19th century. She has also edited several collective works, the last of which is: *Imaginarios, naciones y escritura de mujeres del siglo XIX en América Latina*, Alicante, Universidad de Alicante, 2021. She co-directs the project “Héritages et ruptures de l’Europe dans la construction de la judéité latino-américaine” (funded by CIERA) with the University of Lorraine, including a conference to be held in Orléans (Rémélise and Studium) in May 2022.

TRANSLATION AFTER THE SHOAH: TOWARDS AN EPISTEMIC RECOVERY OF THE JEWISH POETIC ARCHIVE

This project, inaugurated on November 16th, 2021, is framed in the interdisciplinary field of Translation Studies. It aims to pursue a comparative examination of four Roman translations of the lament *Dos lid funem oisgehargetn yidishn folk*, written in the antechamber of Auschwitz by the Polish poet Yitsjok Katzenelson (1886-1944), one of the most important bilingual Yiddish-Hebrew poets and dramaturges of his time.

The study proposes to focus on the poetic forms and language of these translations, and to offer a sociocultural perspective devoted to analyzing their role in the unearthing, symbolic as well as physical, of the Jewish voice and its reincorporation into the contemporary polyglot Jewish archive. The research explores the intercultural and inter-historical relations that these translations produce, especially in the case of the Judeo-Spanish translation and the role it plays – paradoxically – when translating from one endangered Jewish language (Yiddish) into another one (Judeo-Spanish). These translations are considered as actions working towards an epistemic recovery of the Jewish poetic archive inhumed during the Shoah.

The main goal of the study is to produce new knowledge on the practice of Jewish translation, its material culture and cultural transmission.

The initial hypothesis stipulated here is that the 21st century (starting from the formal end of the Cold War, 1989) gave place to a large phenomenon of epistemic recovery, through which an important memory making is being held. In this framework, Jewish memory and cultural productions are being recovered and reestablished. In the heart of this phenomenon, translation plays a significant role, and the translation of Jewish literature, especially into (and between) endangered languages, might become a discipline in itself. This study aims at understanding the phenomenon, and at placing it in the global, as well as the more specific, Romance languages contexts.

Research questions:

What are the poetics of each of the French, Spanish and Judeo-Spanish translations of *Dos lid*? Which are the political and ethical implications of unearthing Katzenelson’s texts through translation, and thus of symbolically repeating – distinctly in each language – the exhumation of the poems from the concentration camp? In which ways do they produce a difference responsible for denouncing the genocide as well as ensuring, at the same time, the permanence of the Jewish voice? What are the multidirectional memories evoked and produced through these translations?



Prof. Salvatore Magazù

LE STUDIUM Research Professor

From: University of Messina - IT

In residence at: Center for Advanced Studies in the Renaissance (CESR) - Tours

Nationality: Italian

Programme: SMART LOIRE VALLEY

Dates: June 2021 to September 2021

Salvatore Magazù is full professor of experimental Physics at Messina University, president of the Interuniversity Consortium of Applied Physical Sciences, member of the L’Oréal-UNESCO For Women in Science Jury, and member of the National Commission of Experimental Physics. In 2016-2017 he was a LE STUDIUM research fellow at CBM and ICMN (CNRS). From 2013 to 2015 he was chair of the LE STUDIUM Consortium COSMO. Between 2010 and 2012 he was the president of the scientific board of the European Synchrotron Radiation Facility. Before that, from 2009 to 2010, he was a LE STUDIUM researcher at CEMHTI-CNRS, and from 2008 to 2010 he was a member of the scientific college of the Institut Max Von Laue - Paul Langevin. He is the spin-off founder and president of the Scientific Council of the Start-up ATHENA Green Solutions. His research activity has produced 367 Scopus scientific publications, an H-index of 48, and many awards, among which the Scientia Europea 2000 Award by the French Academy of Sciences.



Prof. Pascal Brioiist

Host Scientist

Pascal Brioiist is a University Professor in History and has been a member of the Center for Higher Renaissance Studies (CESR) since 1994. He is a specialist in cultural history and history of England (PhD from the European University Institute in Florence in 1992). His work is currently mainly in the field of the history of science and technology. He has been a member of the steering committee of the French Society for the History of Science and Technology since 1995. He has published several articles on the intellectual and scientific history of the Renaissance and created the scientific design of Leonardo da Vinci Park in the Clos-Lucé in Amboise in 2002. He is currently in charge of feeding the Renaissance website for which the CNED and the CESR share responsibility.

INTERDISCIPLINARY ANALYSIS OF LEONARDO DA VINCI’S STUDIES ON DYNAMICS

The project is dedicated to the investigation of Leonardo da Vinci’s scientific production with a focus on dynamics. The investigation is performed through a synergistic approach based on a continuous work of translation and reconstruction that integrates different exact and human sciences sources, with a particular reference to physics and history. In fact, while individual disciplines are often constrained by their own methodological and content-related limits, such a context-oriented work requires a cooperative interdisciplinary approach. It clearly emerges that Leonardo used to perform his studies on dynamics crossing different disciplinary domains – not pursuing approaches based on disjunction, reduction and abstraction, i.e. on the simplification which lies behind a modelling process, but through interdisciplinary approaches which are nowadays reputed essential for effectively investigating complex systems and not only simple or simplified systems. To report a specific case as an example, in the investigation and in the graphical representation of the pendulum motion, Leonardo takes into account large oscillation angles, adopts a variable sampling time in order to better follow the pendulum dynamics, and highlights how the oscillating mass in the course of its motion cannot reach the previous height level, evidencing the impossibility of neglecting dissipation.

These studies require clarifying his concept of time; Leonardo always assumed a conciliator approach between the experience and the theory, not accepting, in an exclusive way, extreme positions; following Leonardo, without experience there is no certainty, and there is no certainty when it is not possible to apply mathematics. The interest of Leonardo for both the theoretical concept of time and for the experimental measure of time emerges directly and indirectly in several sentences of his writings.

More specifically, on the one hand, Leonardo attributes some geometrical properties to time by establishing analogies between space and time through the point-instant and line-time interval couples, and through proportion, which implies linearity and extensivity. Consequently, time can be dealt with as a continuous quantity that, being infinitely divisible, allows to conceive a potential infinitesimal time. Another relevant feature attributed to this concept of time, distinctive in respect to space, is its being invisible and incorporeal, which allows to assimilate Leonardo’s time interpretation to that of absolute time, later introduced by Isaac Newton. Furthermore, besides this geometrical time, Leonardo conceived an imperfect, experimental, measured time in several of his sentences.

On the other hand, Leonardo assigns to time a quality different from its geometric extensive features; in particular, he attributes to time the quality of universal degrading agent. On this concern, the 195 r folio of the Codex Atlanticus contains evocative passages, partially elaborated by Leonardo, extracted from *The Metamorphoses*, a Latin narrative poem by the Roman poet Ovid, in the vulgarization of Arrigo de’ Simintendi da Prato. The protagonist of this book, which had been the great book of Nature of the young Leonardo where he could have read the history of the World from the original chaos and creation to deluge, is time, intended as the instrument of necessity. From these passages, it is possible to argue that Leonardo applies this quality of time, as a degrading agent of all the World’s things, as a universal principle valid for the evolution of all real systems. A Nature emerges that does not break its laws and is conceived as an inexorable chain of causes; furthermore, establishing an equivalence among the terms necessity, dissipation and eternal rule, a deterministic vision of Nature emerges, whose laws are governed by the eternal rule of necessity and dissipation, as today established by the memory function approach.

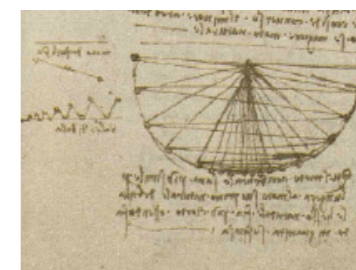


Figure: Sketch of Leonardo’s pendulum characterized by large oscillation angles, variable sampling time and dissipation.



Dr Valérie Hayaert

LE STUDIUM / Marie Skłodowska-Curie
Research Fellow

From: Käte Hamburger Kolleg «Law as Culture», University of Bonn - DE

In residence at: Center for Advanced Studies in the Renaissance (CESR) - Tours

Nationality: French

Programme: SMART LOIRE VALLEY

Dates: September 2020 to October 2021

Valérie Hayaert is a classicist, historian and humanist researcher of the early modern European tradition. Her particular interest lies in the *mens emblematica*, the humanist lawyers' invention of woodcut depictions of legal and theological themes, in the tradition of playful seriousness or serio ludere. In 2006, she was awarded the Prize for the best interdisciplinary thesis by the Alumni Association of the European University Institute. Her first book *'Mens emblematica' et humanisme juridique* was published in 2008 by Droz, Geneva. She was a co-editor of the journal *Emblematica: an Interdisciplinary Journal for Emblem Studies* (AMS Press, New York) from 2014 to 2017. Her subsequent work looked at the aesthetics of justice in courthouses of the early modern period until today, carrying a reconstruction of the visual promulgation of law further by examining not only the tradition of juristic emblems but also revising the analysis of the wide variety of images - trees, diagrams, illustrations, genealogies, allegories and various artefacts. In 2017 and 2018, she contributed to two major exhibitions both held in Belgium at the Groeninge Museum of Bruges, "The Art of Law" (16-10 2016 to 7/01/2017) and at the Museum Hof Van Buysleyden in Mechelen, (Call for Justice 23 March-June 24, 2018).



Prof. Stephan Geonget
Host Scientist

Professor Stéphan Geonget, graduated from ENS Fontenay/Saint-Cloud, teaches at the CESR. He has been a junior member of the Institut universitaire de France since 2009. He makes his research in Renaissance Literature in the perspectives of ethical and legal questions. Major historical figures in his research include Rabelais, Montaigne and Marguerite de Navarre, not to speak of Louis Le Caron, to whom most of his recent interests are dedicated, particularly *La Claire. Ou De la prudence de droit* (1524). Professor Geonget's activities cover many other areas including the site Epistemon (University of Poitiers) and the Bibliothèques virtuelles humanistes (University of Tours).

JUSTITIART : IMAGES OF JUSTICE : A EUROPEAN SURVEY OF LEGAL SYMBOLISM

In Europe, most of today's courthouses are symbolically silent. Because Justice not only needs to be done but also needs to be seen to be done, this project challenges the claim that images of justice have an important role to play in the maintenance of social bonds. The power of judicial images is a useful ally to revive the foundational principles of fair trial and due process. What are the benefits and what are the limits of drawing on the past tradition of judicial symbols in Europe?

Drawing inspiration from visual studies, cultural legal history, visual anthropology and performance studies, this multidisciplinary investigation aims at revealing the essential dynamic function of a civic allegory. This can be found within its composition or invention, its role into the dissemination of meaning and the ways in which it was perceived by different audiences, in order to question to which extent this device fulfilled didactic, persuasive, mnemonic, evidential, or deontological functions. Artworks are full social agents, situated at the interface of institutions and emotions.

The project combines historical case studies (1450-1800) with a theoretical approach aiming at defining the power of images within the legal sphere. It analyses courthouses precincts, legal symbolism and territorial patterns in four geographical areas (Belgium and the Netherlands, France, Italy and the United Kingdom).

At present, Valérie Hayaert's primary focus has been to study allegories of Justice. At the time of publishing, she is writing a book on the topic. Interest in the allegories of Justice is triggered by several trends in cultural and visual studies, whereby aesthetic expression is approached through cognition, performance and an awareness of Lady Justice as a sensual and spiritual body. The main goal of this book is to suggest that allegory is carnal knowledge: as a performative body, Lady Justice brandishes her attributes through powerful gestures and this aspect of the representation has rarely been recognized and analysed. Instead of focusing on the semiotic nature of the fixed grammar of attributes as objects, it will examine how she gestures towards meaning as a subject and how her moral body is used as an intermediary bridge between subject and signified. Her body will serve as an index to the analysis of salient gestures and that is the reason why the table of contents proposed follows an anatomical line.



JUSTICE EN SCÈNE(S)

The first day, hosted in the beautifully frescoed Salle des Assises du Tribunal judiciaire de Tours, was meant to analyse the paradigm of the Last Judgement within the courthouse precincts from a theological, philosophical, anthropological and judicial point of view. While the courthouse itself preserves two gigantic Christs (today in the so-called "Escalier des Christs") the first day also featured the presentation of court sketches from the court audience reporter Noëlle Herrenschildt (including recent examples from the Bataclan trial), echoing the exhibition of court drawings by the local sketcher Philippe Delors, then on display in the courthouse corridors.

The second day was held at the Fine Arts Museum of Tours. It was the occasion for two of the speakers to comment artworks in situ (the two tavolette preserved in Tours as well as a fan depicting an allegorical scene involving Lady Justice, brought for the occasion by one of the speakers). Two speakers agreed to have a respondent commenting on their topic, aiming at bridging the epistemological gap between art and law. All sessions were followed by rich scientific interactions and fruitful networking. The conference was a great success, the venues were indisputably much appreciated by the speakers and the audience. Attendees included some students (day one, first session) who had the chance to view the allegorical fresco by Jules Quantin adorning the courthouse's most impressive room. We had a nice glimpse into the CESR thanks to Concetta Pennuto who showed us the rare books section and the Chapel room.



SCIENTIFIC COMMUNICATION

Dr Valérie Hayaert

- Hayaert, V. An Example of Judicial Ekphrasis: Gregor Bersman's *Imago Justitiae*, Leipzig, 1579, Oral communication at the 67th Annual Meeting of the Renaissance Society of America (Virtual), 22nd April 2021.
- Hayaert, V. Virtual discussion on RSA disciplines: the aim of the meeting was to reflect on ways in which intersectionality and multidisciplinary perspectives could be enhanced more efficiently, Renaissance Society of America Virtual meeting, 23rd June 2021.
- Hayaert V. Images of Justice and the Public Stage-Management of Capital Punishment, Oral communication at LE STUDIUM Thursday Seminar, Musée des Beaux-Arts d'Orléans, France, 1st July 2021.
- Hayaert, V. Les rôles de l'image dans l'imprimé juridique (XVI^e-XVII^e siècle) : Arts de mémoire, diagrammes visuels et « hiéroglyphes du droit », *Histoire de l'édition juridique (XVI^e-XXI^e siècle) : un état des lieux*, LGDJ, Contextes, dir. Carvais, R. & Halpérin, J.L. July 2021, pp. 219-256.



Dr Francesca Pucci Donati

LE STUDIUM Visiting Researcher

From: University of Bologna - IT

In residence at: Center for Advanced Studies in the Renaissance (CESR) - Tours

Nationality: Italian

Programme: SMART LOIRE VALLEY

Dates: September 2021 to December 2021

Francesca Pucci Donati has been a senior researcher (RTDb) at the Department of History, culture and civilisation of the University of Bologna since September 2019. She obtained her PhD in Medieval History in 2004, with a thesis on medical treatises in the Middle Ages (printed in 2007) and went on to conduct Post-doctoral and further research on food culture, supply and food professions in the late Middle Ages and in the Renaissance. In 2008, she attended a two-year archive course in Bologna and was awarded the diploma. She obtained the following academic titles: the French national qualification (maître de conférences) in Medieval History (2016, renewed in 2020); the Italian qualification as Associate Professor in the same discipline (2017, still valid). She published the outcomes of her archival research in four books (2014, 2016, 2018, 2019). Since 2004 she has participated in various French and Italian conferences on medieval and Renaissance history.



Prof. Bruno Laurioux
Host Scientist

Bruno Laurioux is Full Professor of Medieval and Food History at the University of Tours and attached to the Centre d'Études Supérieures de la Renaissance or CESR (UMR 7323). He has published 22 books and 79 scientific articles, especially on Food History. At the University of Versailles-Saint-Quentin and then at the University of Tours, he has supervised a dozen of PhD theses and has had the experience of supervising a Post Doc scholar on Medieval Food Market in a comparative scale. He is the scientific coordinator of an international research program (CoReMA, Cookery Recipes of the Middle Ages, ANR-FWF) and the Chairperson of the European Institute of Food History and Culture (IEHCA). He has organised various International Conferences on Food History in France or abroad. The last one was « The Culinary Recipes».

FOOD TRADE AND PROFESSIONS IN THE LOIRE VALLEY DURING THE RENAISSANCE. A PRELIMINARY RESEARCH

The theme is very much a topical issue and takes into account the transformations that have recently occurred in the fields of economics, technology, cultural traditions and mentality. We are facing some very important challenges, such as quality and prices control; emerging cutting-edge digital technologies; workplace safety; wage developments; market rules. History can provide some interpretative keys of how preindustrial societies reacted to similar problems. In this respect, a significant area to study is the Loire Valley and the cities that overlook the river, especially Tours, which became the king's privileged location during the 15th century. A cosmopolitan population, composed by the Greats of the court, ambassadors, merchants and other important personalities, got to Tours and expected to be comfortably housed and fed. The king's choice promoted a strong development of urban economy and, consequently, of food professions and hospitality. One objective of the project is therefore to create a body of data through the study of the public and private records kept at the Municipal and Departmental Archives of Tours about butchers, bakers, fishmongers, innkeepers and others food categories. The chronological period taken into account includes the 15th and 16th centuries, in order to highlight the development of the craft sector from the Middle Ages to the Renaissance. Even if the sources are known and a number of works have been published, there are still many documents to discover, in particular the notarial deeds, the series of deliberations (BB) and the accounts (CC) of the Town. Another goal is to try to answer a few questions such as: how did the local government run food and its distribution? How did guilds contribute to the urban growth and supply? What kind of relationship was there between food professions and the authorities (king and local government)? What role did the welcoming sector play in the image of «ville royale»? Did the innkeepers retain the function of public officers in the Renaissance as they did in the 12th century? Evidence of this comes from one of the oldest scrolls kept at the Municipal Archives dated 1141. The last issues are actually a further objective of the research, in the sense that the world of hospitality is an interesting field of contacts between the public and private sectors; producers, distributors and customer; cooking practices and local habits. The achievements to date in the first phase of the project can be summed up in three points. First, the creation of a detailed map of Tours' inns. Second, the processing of a Data Table containing details on innkeepers (year, their name, the parish to which they belonged, name and urban localization of inns). Finally, the description of the activities and the family ties of a number of innkeepers, through the comparative analysis of the notarial deeds, the deliberations and the accounts of the city. All this material will converge in a first study on the hospitality sector in Tours during the Renaissance.



Dr Esperanza Rodríguez-García

LE STUDIUM Guest Research Fellow

From: NOVA University of Lisbon - PT

In residence at: Centre for Advanced Studies in the Renaissance (CESR) - Tours

Nationality: Spanish

Programme: MSCA INDIVIDUAL FELLOWSHIP

Dates: September 2020 to April 2022

Esperanza Rodríguez-García is an MSCA Individual Fellow at the CESR-Université de Tours (project rated 100/100), while on leave from her post at the CESEM-Universidade Nova de Lisboa (Portugal). She has previously worked for universities in the UK, where she obtained her PhD. She has recently accepted a tenure-track position at the Universidad Complutense de Madrid, obtained through the competitive "Ramón y Cajal" programme, from the Spanish Ministry of Science. She will be moving in the spring (date to be confirmed by the Ministry of Science). Her research interests concern music-within-culture in the Early Modern period in the Iberian Peninsula. She has specialised in methodologies such as the history of reading, source studies and critical editing, historiography, and prosopography. Digital Humanities is also a very strong component of her research, and she has worked on database design and curating, computer-assisted analysis, music encoding, and valorisation of music as intangible heritage through the re-enactment of historical soundscapes.



Dr David Fiala
Host Scientist

David Fiala has been an Associate Professor in Musicology at the CESR-UT since 2009 and is a former editor (2007-2013) for the Revue de Musicologie. He has published widely on musical patronage and musicians' careers in the late medieval and early modern periods. His other specialisms are digital humanities and e-musicology. His interests include the Modelization of historical documentation; Digital Music Encoding (in MEI), investigating addressability of musical scores, digital libraries and analysis of imitation in musical works of the Renaissance and 3D/4D Modelization of musical spaces, specially by reconstructing historical buildings no longer extant. He is a member of the Scientific Board of the TGIR Huma-Num. He has co-directed three PhDs and has an extensive experience in supervising and training postdoctoral researchers from Italy, Australia, Canada, France and The Netherlands.

EXPERIENCING HISTORICAL SOUNDSCAPES: THE ROYAL ENTRIES OF EMPEROR CHARLES V IN IBERIAN CITIES

The MSCA Individual Fellowships have a two-layer component (research and training) with complementary objectives.

There are three goals concerning research, which are the following. First, to identify, describe and assess the structural sonic and spatial elements of Royal entries in Iberian cities during the life of Emperor Charles V (d.1558). A musicologically-informed overview of all the entries' accounts will enhance, through comparison, the quality of our understanding of the sources and their vocabulary (R01). Second, to map and contextualise sonic events within their spatial coordinates, so as to provide them with full historical and cultural meaning (R02). Finally, to facilitate the experiencing of soundscapes through the creation of tools to retrieve and valorize them as intangible cultural heritage, in the shape of an immersive multimedia event (R03).

There are four goals concerning training, which are the following. First, to master advanced tools for data organisation and management, including Data mining and archiving (T01). Second, to become proficient in managing and transforming historical data for use in digital formats through the creation of a relational database anchored to a GIS map contextualising and spatializing soundscapes (T02). Third, to become competent in designing multisensory immersive events (through the modelization of the soundscape of a Royal entry) (T03). And finally, to master the theoretical framework and the techniques of digital mediation of culture, heritage and tourism applied to management and museography of intangible heritage (T04).

In the period January-October 2021, Esperanza Rodríguez-García finished all the training, through the CESR MA programme "Digital Mediation of Culture and Heritage". She is now conversant with techniques of data treatment, relational databases, the theoretical framework of Digital Humanities and Heritage management. She is currently applying her newly acquired skills to the design and implementation of a relational database and the modelization of the soundscape of a Royal entry.

Concerning research, R01 and R02 are almost completed, with most of the acquisition of data about Royal entries and their mapping finished. However, due to the complications of the Covid lockdown, there are additional (but essential) sources that have not yet been consulted. These circumstances have delayed the completion of the article on soundscapes. She is currently finishing R01 and R02 while working fully on creating a geolocalised sound walk reconstructing the historical soundscape of a royal entry (R03).



Prof. Maria Teresa Salgado

LE STUDIUM Visiting Researcher

From: Federal University of Rio de Janeiro (UFRJ) - BR

In residence at: RÉMÉLICE (Réceptions et Médiations de Littératures et de Cultures Étrangères et comparées) - Orléans

Nationality: Brazilian

Programme: SMART LOIRE VALLEY

Dates: January 2021 to December 2021

Maria Teresa Salgado holds a degree in Letters (English), from the Federal University of Rio de Janeiro (1982); Master's Degree in Brazilian Literature from the Federal University of Rio de Janeiro (1988). She also holds a PhD in African Literatures from the Pontifical Catholic University of Rio de Janeiro (1998) and has developed postdoctoral research in Portuguese Language Literatures in Paris IV (Sorbonne), with an emphasis on female writing (2015). She is currently an associate professor of African Literature at the Federal University of Rio de Janeiro, the university where she has worked since 2006. She has experience in the field of Literature, focusing on Portuguese Language Literature (African Literature, Afro-Brazilian and Portuguese) and working mainly on the following themes: African literatures and comparative literatures in Portuguese. She develops research about images linked to the universe of laughter, the search for happiness and gender issues. She is a research associate at CRIMIC (Centre de Recherches Interdisciplinaires sur les Mondes Ibériques Contemporains).



Prof. Catherine Pélage
Host Scientist

After studying Spanish at Paris Sorbonne University and training in translation at the Complutense University of Madrid, Catherine Pélage obtained the Spanish aggregation. She was responsible for the international mobility of Spanish students, for Master's courses as well as for the cultural and student association life at the University of Orléans. She is currently the director of the Spanish department and deputy director of the Rémélise Laboratory in Orléans, France. She is currently working on the migrant writing of Dominican authors, on the literary performances of very contemporary Dominican artists and on the representation of insularity. She is currently the leader of the «Insularities and intercultural dialogues» project funded by the Maison des Sciences de l'Homme Centre-Val de Loire.

LEDA RIOS, A VOICE COMES OUT OF SILENCE

Looking for and bringing Leda Rio's work together (poetry, theatre, chronicles, press articles, novels) is one of the main objectives of this research. Until now, Maria Teresa Salgado has brought together most of Leda Rios' work, despite the obstacles related to the COVID pandemic virus. Her and her team have found her books – two books of poetry –, a great part of her chronicles and short stories published in the press, as well as her interviews and opinion articles published therein. Unfortunately, her theatre work and her novel have yet to be found. They believe that after the COVID crisis, they will be able to visit some places (libraries, national archives, and antique bookshops) that have remained closed for the last two years.

They have also pointed her contributions to literature and to women's place at her time and society in one of the conferences presented at the Orléans University in November - Leda Rios' a courageous intellectual in the carioca belle époque. ("Leda Rios une Intellectuelle courageuse à la belle époque carioca"). They have depicted Leda Rios' journey to «break the silence» at a time when women's words were not considered, especially those of black women. Another objective is to elaborate Leda Rios' biography. This part will portray the poet's life, highlighting the socio-historical vision of her time and the place of black women. In this way the barriers and obstacles that she had to face have been discussed. The team have elaborated Leda Rios' biography, based on real facts, but also with fictional reconstruction of the unknown periods of her life.



Dr Alexandre Vanautgaerden

LE STUDIUM / Marie Skłodowska-Curie Research Fellow

From: Royal Academy of Belgium - BE

In residence at: Centre for Advanced Studies in the Renaissance (CESR) - Tours

Nationality: Belgian

Programme: SMART LOIRE VALLEY

Dates: October 2020 to October 2021

Dr Alexandre Vanautgaerden was a film director at RTBF (French-speaking Belgian television radio, 1990-1994). He then became the Head of the Erasmus museum, Brussels, Belgium (1994-2012). He later became a lecturer and the person in charge of the "Inventory and Heritage" module, Master of Advanced Studies "Conservation and Heritage" at the University of Geneva, Lausanne and Fribourg (Fall 2016, 2017 and 2018). From 2012 to 2018, Dr Vanautgaerden was the Head of the Geneva Library, Switzerland. He was the Director of Publications and Scientific Director of Exhibitions at the Musée Granet, Aix-en-Provence from 2018 to 2019. He was a research fellow at the University of Bonn, Kate Hamburger Kolleg (2019-2020). Dr Vanautgaerden received several awards such as the Prize of the Royal Belgian Academy for his work Erasmus and the Printers in 2008, and a Diploma of Honour of the Community Association of the European Order of Merit (ACOEM) in 1998.



Prof. Benoist Pierre
Host Scientist

Benoist Pierre is a full Professor (First Class) at the University of Tours. In 2016, he was elected Director of the CESR (UFR and UMR 7323) and of I-Pat (Intelligence des Patrimoines Programme) for five years, led by the CESR which involves several hundred researchers and more than 40 laboratories in the Centre-Val de Loire Region. His research work, which was initially focused on the relations between religion and politics in modern-era Europe, is currently being developed within the CESR according to three axes. The first is the analysis of court societies and their relation to the State in modern Europe, while the second is the study of heritage and more particularly châteaux heritage in the Val de Loire and finally the third is the notion of media coverage and promotion of sciences principally on culture, heritage and humanities. Prof. B. Pierre has published 12 books, 60 papers in international peer-reviewed journals and presented 70 public talks.

MUSEION. FROM SPACE TO PLACE: REBUILDING MEMORY INSTITUTIONS

This research project is at the crossroads of museography, digital humanities, and library science. It aims to analyse the transformation of physical areas in heritage spaces (museums, libraries, archives) consequent to the development of digital humanities. Until the present time, research in museography and library science have taken parallel paths that rarely converge. Today however, museums, libraries and archives are forced to rethink their public spaces in light of the fact that new practices of their often-identical publics, navigate into virtual worlds generated by the digital revolution.

For some twenty years, museums, libraries and archives have been forced to reconsider the way they function. In a first stage, they developed, in parallel with the collections and spaces they managed, digital databases as if they were building physical architectures. In many cases, these virtual collections only mirrored the physical collections, but they could not communicate with each other. Moreover, and this was a significant disadvantage, virtual collections unconnected in their own silos, were unable to exchange their data. Fortunately, over the past decade, new digital programmes based on the interoperability of texts and images have emerged.

Interaction design is now part of museum scenography, and the user experience becomes one of the fundamental data of digital projects designed by museums or libraries.

The crucial question today is how to design and develop these new heritage spaces by offering a real dialogue between the physical collections and the digital humanities projects that are developed from them. This research project aims to take stock of the research carried out in innovative places in order to propose new ways of developing heritage spaces in line with the current expectations of the public. Six geographical areas have been considered (France, Belgium, the Netherlands, England, Denmark, and Switzerland) over time.

To start with, the project has focused on a theoretical and historical review of these spaces:

- 1- Theory : Literature review of the last 15 years on the convergence between museums - Library - Archives
- 2- History : A summary of the development of digital projects in France since 2006 and the digital Grand Versailles project
- 3- Conceptual : Inventory of the different notions at work in museology projects based on current digital humanities such as: immersion, geolocation, augmented reality, user experience, soundscape.

At the same time, the project has investigated the literature currently being produced on surveys of professionals following the consequences of the Covid-19 crisis. They cover critical emerging subjects for the museums landscape:

- Citizen approach: a project in England (The museum of the future)
- Hybrid Museum
- Empty Museum (The Empty Museum)



Prof. Eugene Schreurs

LE STUDIUM / Marie Skłodowska-Curie
Research Fellow

From: University College Antwerp - BE

In residence at: Center for Advanced Studies in the Renaissance (CESR) - Tours

Nationality: Belgian

Programme: SMART LOIRE VALLEY

Dates: September 2020 to October 2021

Eugeen Schreurs is both a professional performer and musicologist. He studied viola da gamba (W. Kuijken) at the Brussels Conservatory (1982) and musicology at the University of Leuven (1980). He obtained his PhD in 1991 with a study on musical life in Tongeren (c.1400-1797), applying the so-called urban musicology method. As director of the Alamire Foundation, international centre of the Music in the Low Countries (1990-2002) he laid the fundament for similar studies of other cities (i.e. Antwerp, Brussels, Diest, Ghent, Lier, Maastricht). He was editor-in-chief of the Yearbook of the Alamire Foundation (1994 - 2008), and of the series Monumenta Flandriae Musica (1996 ff.). He taught at the University of Leuven (2002-2006) and at Antwerp Royal Conservatory (1989-present), in 2002 he co-founded Resonant, Centre for Flemish Musical Heritage, which he led until 2009. He received several awards (Province of Limburg; Belgian Royal Academy; Cera-Jeunesses Musicales).



Prof. Philippe Vendrix
Host Scientist

Philippe Vendrix is the former Director of the Centre d'Etudes Supérieures de la Renaissance (2008-2015). He obtained his PhD in musicology in 1991, with the highest distinction from the examination jury at the University of Liège. He has been a member of the Council of the American Musicological Society, 2001-2004. He was elected in 2010 to the Alumni College of the Belgian Royal Academy. He has editorial management responsibilities in various collections including Ricercar. He is on the editorial board of leading publications in musicology and a member of the Scientific Council of Répertoire International de Littérature Musicale, New York and the European Science Foundation. He was the president of the University of Tours from 2016 to 2020.

MUSIC IN THE COLLEGIATE CHURCH OF OUR LADY IN ANTWERP (C. 1370 - C.1530): A EUROPEAN HUB?

Until now, research on music in the collegiate church of Our Lady in Antwerp has mainly focused on the 'Golden' sixteenth century, but not on the fifteenth when its foundations were laid. The latter period has not been the subject of a comprehensive musicological study meeting today's scholarly standards, yet it was precisely then when composers of international renown were employed at Antwerp's main church. This immense building, then still unfinished but with the magnetism of a Gothic cathedral, was the city's musical epicentre. Composers such as Ockeghem, Barbireau, and Obrecht flourished there. Close ties with the chapels of both the Burgundian-Habsburg court and the pope, its position of favour with the Habsburg monarchs, bustling commercial contacts throughout Europe, and donations to the church from wealthy citizens wanting to ensure their salvation made it one of northern Europe's most important capitals, famous among many things for music.

The primary intention of this study is to arrive at a better understanding of the mechanisms underlying this rich music scene, and to place them in their urban, socio-cultural, and European contexts. This contextualization, along with an interdisciplinary approach to the issue, will undoubtedly provide a new and better explanation for the blossoming of this extraordinary musical culture. The existing studies on the subject mostly consider the period after c.1490 and do not take account of an essential part of the cathedral's archives or of the historical context. The project described here proposes new approaches that consider music to be an essential element of a vital liturgical and urban context. This research will improve our understanding of how the many Renaissance compositions at the Church of Our Lady were performed and heard, and permit better historical reconstructions of their acoustical and visual environments.



MUSIC AND LIVED RELIGION IN THE COLLEGIATE CHURCH OF OUR LADY IN ANTWERP (1370 - 1566). A MULTIDISCIPLINARY STUDY IN A EUROPEAN CONTEXT

The objective of the colloquium was to discuss musical life in the collegiate church of Our Lady in Antwerp as a case study in order to arrive at a better understanding of music in the context of liturgy, audience perception, and to detect and correct outdated assumptions.

Comparative research with churches outside the Netherlands opened up new insights. In other words, the colloquium resulted in a lively discussion with a very interdisciplinary team (music, art and church history, theology, liturgy, social history, etc.).

The results of the colloquium will be incorporated in a book about the experience of music in the Antwerp main church in a broader multidisciplinary and comparative-European context.



SCIENTIFIC COMMUNICATION

Prof. Eugene Schreurs

- Schreurs, E. Benefices for singers in the Low Countries: Leuven and Antwerp as case studies in the Duchy of Brabant (ca. 1370-1530), Presentation of paper during the International colloquium Le fait musical religieux : approches croisées Histoire / Musicologie, Abbaye aux Dames, Saintes, France, 20th-22nd May 2021.
- Schreurs, E. Places of music-making in the Collegiate Church of Our Lady in Antwerp, Presentation of paper during the international colloquium Music and Lived Religion in the Collegiate Church of Our Lady in Antwerp (1370-1566). A Multidisciplinary Study in a European Context, CESR, Tours, France, 2nd-4th September 2021.
- Schreurs, E. De muziekbeoefening: ca. 1400 - 1797, in De Sint-Pieterskerk te Leuven. Architectuur en patrimonium [The practice of music: ca. 1400 - 1797, in The Church of St Peter in Leuven. Architecture and Patrimony], Leuven, Peeters, 2021, 25 pp.



Dr Robert Courtois

CONSORTIUM COORDINATOR



Robert Courtois (MD, PhD) (psychiatrist, associate professor of psychology / senior lecturer), project leader, head of CRIAVS, Psychiatry-Addictology department, Tours University Hospital.

His research areas are psychopathological processes, individual vulnerabilities, risk and protective factors of the behavior of adults reflecting difficulty adapting to change.

- Becoming an adult: risk behaviors, addictions, risky sexual behavior
- Interpersonal relationships: violence, sexual violence, domestic violence, harassment
- Life history, adverse environment, coping with illness: personality, resilience, psychological health and quality of life

ASSESSMENT OF RISK OF SEXUAL ASSAULT: PSYCHOLOGICAL ADJUSTMENT, NEUROPSYCHOLOGICAL AND PSYCHIATRIC DETERMINANTS

The creation of this Le Studium Consortium ARSA ("Assessment of Risk of Sexual Assault: Psychological adjustment, neuropsychological and psychiatric determinants") aims to establish a multidisciplinary international research team of psychologists, neuropsychologists, psychiatrists and criminologists.

The team decided to explore a new way to better understand and explain sexual violence that consists of describing risk factors for coercive sexual relations (including all inappropriate or unwanted relationships) by using a dimensional approach based on the Research Domain Criteria (RDoc) created by the American 'National Institute of Mental Health' (NIMH).

This is a research framework for new approaches to investigating mental disorders. It aims to integrate many levels of information (from genomics and circuits to behavior and self-reports) in order to explore basic dimensions of functioning that span the full range of human behavior (from normal to pathological).

Improving the prevention of sex offending requires multidisciplinary and comprehensive studies (from the general population to sexual offenders). To meet this aim, the team plans to respond to both national and European (or international) calls for proposals.

The team believes that this research could provide the basis for awareness-raising and training of professionals, for disseminating information to the general public, and for improving risk assessment and prevention of sexual violence.

The team responded to the French National Research Agency (ANR) request for proposal (AAPG 2021), which gave rise to the FRIDA project (2022-2025): «From fantasies to problematic sexual behavior and sexual violence in youth aged 18 to 25». The team includes all members of the Studium consortium ARSA, as well as two medical research units of Tours University Hospital: Inserm U1253 iBrain and Inserm CIC-P 1415. It also involves the research group CognNAC from the University of Quebec in Trois-Rivières (UQTR).

PARTNERS



Prof. Thierry Pham

University of Mons - Belgique



Prof. Jean-Pierre Guay

University of Montreal - Canada



Prof. Christian Joyal

University of Montreal - Canada



Prof. Stéphane De Brito

University of Birmingham - United Kingdom



Prof. Philippe Allain

University of Angers - France



Dr Catherine Potard

University of Angers - France

AROUND THE PROJECT

The evolution of society, the media coverage of recent scandals (notably the «Harvey Weinstein» affair), the waves of reaction (#MeToo, #balancetonporc, #Iwas on Twitter), but also the maintenance or increase of interpersonal violence in the public space (including the workplace), come to question the collective representations of the feminine and masculine and male-female interactions, especially those that could lead to violence or, more precisely, from seduction to aggression (various forms of harassment, sexuality with coercive manipulation, etc.).

It is in response to this reflection that the Qualipsy research teams (EE 1901 Quality of Life and Psychological Health), the IRJI (Institut de Recherche Juridique Interdisciplinaire François-Rabelais) and the Centre Ressource pour les Intervenants auprès des Auteurs de Violences sexuelles du Centre-Val de Loire (CRIAIVS CVL) of the CHU of Tours are organizing a multidisciplinary and international symposium «From seduction to aggression? The question of harassment». It will cross points of view with contributions from psychology, sexology, anthropology, sociology and law.

The first day addressed, among other things, the construction of the masculine and feminine in today's society (see, for example, the relationship to new technologies), the place of each, the new reference points in male-female relationships and the limits between seduction and aggression. The second day focused on the issue of interpersonal violence, from a socio-psychological and legal perspective. The interventions aimed to clarify where aggression begins, especially in forms of harassment, how to define, categorize and sanction it, how to take into account the consequences for perpetrators and victims. The colloquium must respond both to issues of awareness and training for students and professionals, but also to a questioning that can feed into research.



SCIENTIFIC COMMUNICATION

Dr Raphaël Cahen

- Cahen, R. Louis-Antoine Macarel président du comité consultatif du contentieux du ministère des affaires étrangères (1849-1851), Oral communication at the International conference Louis-Antoine Macarel (organized by Allorant, P.; Blanco, F.; Eddazi, F.), University of Orléans, 2nd-3rd December 2021.
- Cahen, R. «Domination» et «Antiquité» dans la pensée politique d'Hauterive (1754-1830), Oral communication at Domination et Antiquité. Aspects culturels. 30th anniversary of "Méditerranées", Cairo, Egypt, 31st October- 2nd November 2021.
- Cahen, R. Comments on "Dominic-Alain Boariu (Université de Fribourg, Suisse) - Fieschi à la Cour des pairs", Oral communication at the International conference: Images of justice (Organized by Hayaert, V.), Tours, France, 11th-12th October 2021.
- Cahen, R. Les voyages de Laboulaye (1811-1883) et Kachenovsky (1827-1872) en Espagne et la fondation du droit international, Oral communication at the International conference : Les juristes en voyageurs (Organized by Brunori, L. & Guerlain, L.), University of Bordeaux, France, 7th-8th October 2021.
- Cahen, R. L'Académie des sciences morales et politiques et le droit international, Oral communication at the International conference : Law(s) and international relations (1815-1914) : actors, institutions and comparative legislations, LE STUDIUM, Orléans, France, 17th September 2021.
- Cahen, R. Friedrich Gentz and the Congress of Ljubljana, Oral communication at the Colloque international Congress after the Congress: 200 years after the congress of Ljubljana, Ljubljana, Slovenia (Virtual meeting), 11th-12th May 2021.
- Cahen, R. Le projet européen Krausiste, Oral communication at the International conference: Krausisme juridique et politique en Europe (Organized by Ferreira, O.), University of Dijon, France, 11th-12th march 2021.
- Cahen, R. Socio-cultural history of international lawyers; Oral communication at LE STUDIUM Thursday seminar, 7th January 2021
- Cahen, R. Constitutional and international entanglements: the case of the Consultative litigation committee of the French ministry of Foreign affairs (1835-1871)", in Forum historiae iuris (fhi), 2021
- Cahen, R. Le projet européen krausiste, in Oscar Ferreira (ed.), Krausisme juridique et politique en Europe, Paris, Classique Garnier, 2021, p. 267-287.
- Cahen, R. Friedrich Gentz and the Congress of Ljubljana, in Andrej Rahten, Gregor Antolicic (ed.), The Congress of Ljubljana 1821. Personalities, Events and Historical Context, Klagenfurt, Hermagoras, 2021, p. 95-108.

Dr Jean-François Deluchey

- Deluchey, J.-F. A guerra revelada na pandemia (The war revealed by the pandemic), Oral communication at the III Seminário Internacional em Direitos Humanos e Sociedade (3rd International Congress on Human Rights and Society), Santa Catarina, Brazil, 23rd September 2021.
- Dias, B.; Deluchey, J.-F. Y. The war the pandemic revealed: Bolsonaro and the disposable Brazilian bodies. In: Brandão Augusto, C.; Dornelles, J.R.; Dutra dos Santos, R.; Ramos Filho, W. (Org.). Novas Direitas e Genocídio no Brasil. Pandemia e Pandemonio Vol. II. 1 ed. São Paulo: Tirant Lo Blanch, 2021, v. 2, p. 158-169.
- Deluchey, J.-F. Y. Historicity and legacy of slavery for our contemporaneity, In: Coquet Mokoko, C.; Gavoille, E.; Tatin-Gourier, J.J.; Zapata, M. (Org.). Esclavages et antiesclavagismes. Réalités, discours, représentations. 1 ed. Paris: Editions Kimé, 2021, v. 1, p. 219-230.
- Deluchey, J.-F. Y. O Jacarezinho: uma historia de ninar?, O Liberal (Belém, Brazil), p. 2, 16th May 2021.

Dr Francesca Fantappiè

- Fantappiè, F.; coordination Bachir-Loopuyt, T. Theatre and Music in Early Modern Florence (1550-1650): the Performing Arts as an essential means for interpreting History, Oral communication at Seminar linked to Master programme: Musique et Sciences Humaines, University of Tours, France, 10th November 2021.
- Fantappiè, F. Drammaturgia della luce nel teatro italiano rinascimentale e barocco, Oral communication at XXV Colloquio di Musicologia del "Saggiatore Musicale" (organized by the Dipartimento dei Beni culturali dell'Università di Bologna), Ravenna, Italy, 12th-14th November 2021.
- Fantappiè, F. Éléments d'enquête sur le système de production des spectacles à Florence entre le XVIe et le XVIIe siècle: les motivations de la dépense (supposée ou réelle), entre limites théoriques, convictions idéologiques et pratiques économiques, Oral communication at EHESS (École des hautes études en science sociale de Paris) Seminary, 2021-2022: Une histoire matérielle de la musique et des arts du spectacle: d'une économie domestique à une économie politique (XVIe – XXe siècle), under the direction of Campos, R. and Goulet, A.M. Paris, France, 17th December 2021.

Dr Francesca Pucci Donati

- Pucci-Donati, F. Food trade and professions in the Loire Valley during the Renaissance. A preliminary research, Oral communication at the LE STUDIUM Thursday Seminar, La Villa Rabelais, Tours, France, 4th November 2021.

Dr Esperanza Rodríguez-García

- Rodríguez-García, E. Análisis asistido por computador como herramienta para dilucidar problemas de autoría: el caso de las atribuciones problemáticas en el manuscrito Tarazona 2/3, Oral communication at the X Congreso de la Sociedad española de musicología (10th Congress of the Spanish Society of musicology), Baeza, Spain, November 2021.
- Rodríguez-García, E.; McKay, C. Ave festiva ferculis: Exploring attribution by computational analysis, Oral communication at the Medieval and Renaissance Conference, Lisbon, Portugal, July 2021.
- Rodríguez-García, E. The multi-layered soundscape of Charles V entries in Spanish cities, Oral communication at Sounds of Power Sonic Court Rituals In and Outside Europe in the 15th-17th Centuries, Bern, Switzerland (Online event), June 2021.
- Rodríguez-García, E. Exploring the soundscape of Royal entries in the early Modern period', Oral communication at LE STUDIUM Thursday Seminar, Tours, France (Online event), May 2021

Prof. Maria Teresa Salgado

- Salgado, M.T. Images of the search for happiness in African Literature, Oral communication at LE STUDIUM Thursday Seminar (online event), 4th February 2021.
- Salgado, M.T. Leda Rios, une intellectuelle brésilienne, barrières et obstacles devant le corps métis à la belle époque carioca (Leda Rios, a Brazilian intellectual, barriers and obstacles in front of the mixed body in the carioca belle époque), Oral communication at Online International Colloquium organized by REMELICE at the Orleans University, 25th March 2021.
- Salgado, M.T. La Recherche Doctorale en Humanités - Langue et Littérature (Doctoral Research in Humanities - Language and Literature), Oral communication at Online Regional Meeting Day organized by ADDOSHS - Association des Doctorant.e.s et Docteur.e.s Orléanais.es, 1st June 2021.
- Salgado, M.T. Presentation of research to LE STUDIUM Scientific Council, Online Meeting organized by LE STUDIUM, 9th June 2021.
- Salgado, M.T. Leda Rios, une intellectuelle courageuse à la belle époque carioca (Leda Rios, a brave intellectual at the carioca Belle époque), Oral communication at Cycle de Séminaires du Laboratoire Rémélise, Université d'Orléans, France, 14th October 2021.
- Salgado, M.T. Leda Rios, a voice comes out of silence in Brazil, Oral communication at International hybrid Event Leda Rios e outras escritoras brasileiras, Sorbonne Université, France, 3rd December 2021. Event organized by Salgado, M.T.; Araújo, M.; Riaudel, M.
- Salgado, M.T. Leda Rios, une intellectuelle Brésilienne. Barrières et obstacles devant le corps métis à la belle époque carioca (Leda Rios, a Brazilian intellectual. Barriers and obstacles in front of the Métis body during the carioca belle époque), Revue Hispanismes, 2021.
- Salgado, M.T. Leda Rios – uma voz Negra que sai do silêncio no Brasil (Leda Rios, a black voice comes out of silence in Brazil). In Poétiques et politiques du corps dans les aires lusophones, Edition Hispaniques, 2021; pp 141-149 ; Paris.

Dr Alexandre Vanautgaerden

- Vanautgaerden, A. General presentation of innovative projects to feed the reflection on the Virtual Music Heritage mediation projects, CESR, RICERCAR laboratory, 3rd March 2021
- Vanautgaerden, A. Museums in the face of Covid: the birth of a digital humanism or of an entertainment society?, Video conference at the European Commission, 15th April 2021
- Vanautgaerden, A.; Bernon, M.L.; Bastard, I.; Zaslavsky, F. Interviews with three sociologists from the Bibliothèque Nationale de France on the audience of online exhibitions, 21st May 2021
- Vanautgaerden, A. Museums during COVID-19: the sweet hereafter?, Oral communication at LE STUDIUM Thursday Seminar, Law Faculty in Tours, France, 9th September 2021
- Vanautgaerden, A.; Penutto, C.; Saulnier, D. Workshop on Renaissance Latin, around a text by Erasmus: «Abbatis et eruditae», CESR, Tours, France, 12th and 26th March & 9th, 19th and 26th April 2021
- Three study days aimed to put into methodological perspective the reflections developed in the work of Jean-François Gilmont on the history of the book and the history of the Reformation, Milan, Tours and Brussels, 27th April 2021, 15th June 2021 and 24th November 2021
- Vanautgaerden, A. Les trois vies de Jean-François Gilmont (1934-2020), Bulletin de la Société française d'Etude du Seizième siècle, 91, 2021
- Vanautgaerden, A. Review of the book by Sebastiani, V. (Johann Froben, Printer of Basel. A Biographical Profile and Catalogue of His Editions, Leiden, Brill (Library of the Written Word, Volume: 65), 2018, 830 pp.), Bibliothèque Humanisme Renaissance, Geneva, 2021, Vol. 83-2, pp. 374-377

TRANSDISCIPLINARY APPROACH



Emblematic of the transdisciplinary approach developed by LE STUDIUM Loire Valley Institute for Advanced Studies since 2010 to energize the regional scientific community exchanges are the monthly LE STUDIUM THURSDAY seminars.

These cross-disciplinary meetings take place every first Thursday of the month, gathering LE STUDIUM Research Fellows in residence, their laboratory hosts and guests from the scientific, industrial and institutional sectors. Each month, two of them are invited to present their research project and scientific objectives.

All international researchers visiting the Centre-Val de Loire region are invited to attend these meetings. Regional PhD students of Doctoral Schools have the possibility to register and attend these seminars to enlarge their scientific field and discover new disciplines. Regular attendance enables them to validate credits.

LIFE OF INTERNATIONAL RESEARCHERS IN THE REGION CENTRE-VAL DE LOIRE

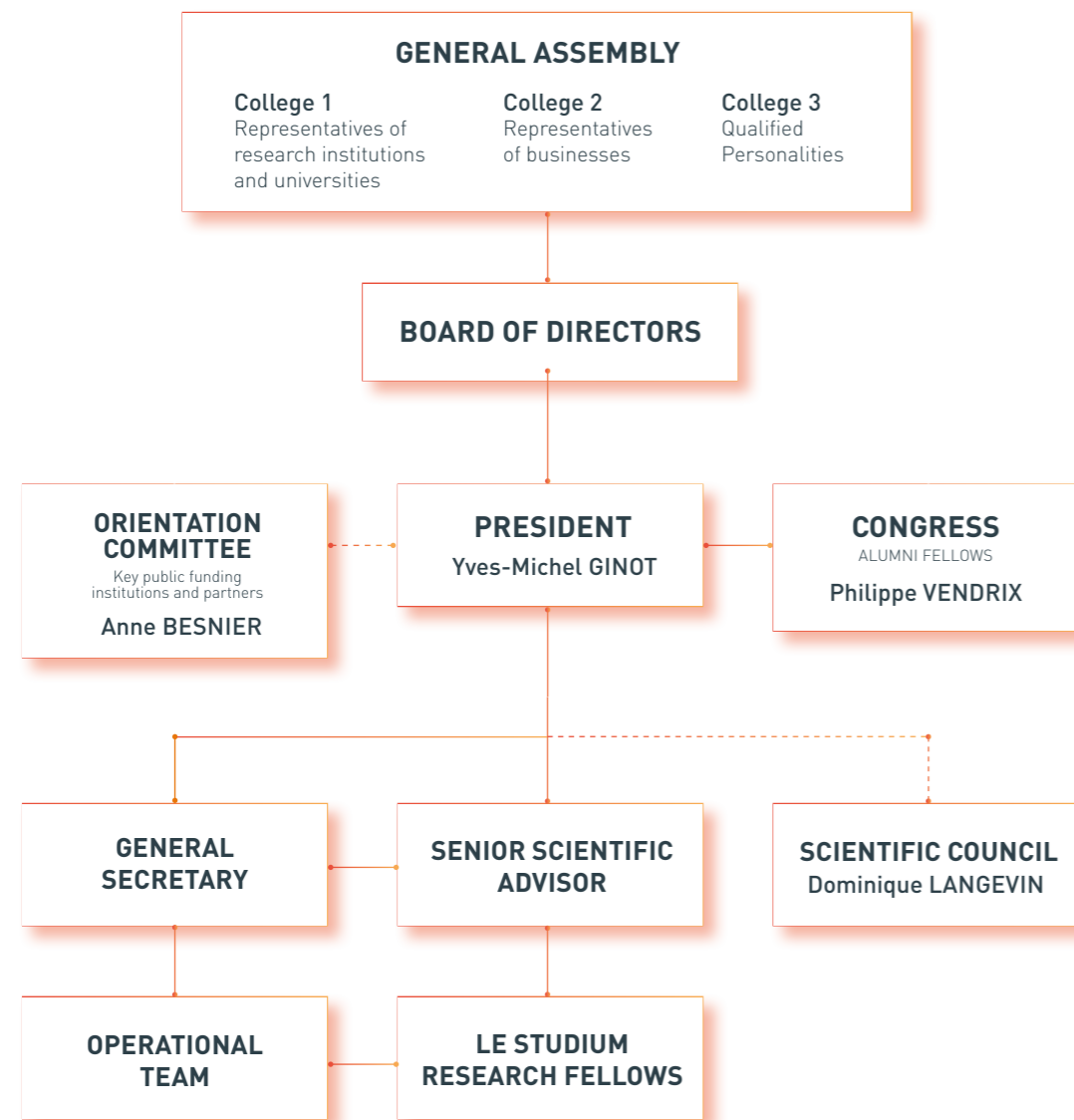
In all regional cities (Blois, Bourges, Chartres, Orléans and Tours) LE STUDIUM Research Fellows benefit from exceptional living and working conditions. Well established research institutions and laboratories offer their office and equipment facilities and LE STUDIUM offers fully furnished accommodation as well as high-quality integration support and assistance. During their residency period in the region, each of them has the opportunity to attend many international events and to organise at least a major one.

In Orléans where LE STUDIUM headquarters are located, Research Fellows are regularly welcomed in the heart of the city in the prestigious Hôtel Dupanloup, the International University Centre for Research. This 16th century former bishop's residence has been brightly renovated using patrimony's architects and designers' talents and offers a prestigious modern and ancient decor to all scientific events. Walking distance from the Hôtel Dupanloup in Orléans, LE STUDIUM houses Research Fellows in a newly renovated castle of the 18th century, Le Château de la Motte Sanguin. This impressive building offers seven apartments with a view over the Loire river, a terrace and a garden in which to relax. In the dynamic city of Tours, LE STUDIUM maintains a few private residencies in the city centre. Tours is a university city with a highly developed touristic and cultural offer.

Every year, social and networking events are organised, giving international LE STUDIUM Fellows and visitors a chance to discover more of the regional scientific and cultural environment, deepen their scientific knowledge in a wide spectrum of disciplines and take part in instructive interdisciplinary exchanges.



GOVERNANCE



LE STUDIUM Loire Valley Institute for Advanced Studies is a non-profit organisation of Law 1901 registered in 1996 in Orléans, France. It is administered by a General Assembly of Members, a Board of Directors, an Orientation Committee and a Management team. The General Assembly of members is composed of 3 collegia:

- Representatives of research and higher education institutions,
- Representatives of businesses,
- Qualified personalities,

and meets annually to review the past year's activities. Every four years, this General Assembly reviews the composition and elects a new Board of Directors. Local and regional institutions are represented at LE STUDIUM Orientation Committee. The Board of Directors and the Orientation Committee meet two to three times a year to review the activities according to an agreed strategic plan. The Board of Directors prepares reports and decisions to be submitted to the General Assembly. The President of LE STUDIUM is appointed for four years and reports to the Board of Directors. LE STUDIUM President oversees the activities performed by a small dynamic team based in Orléans.

SCIENTIFIC COUNCIL

LE STUDIUM Scientific Council establishes the final ranking of applications and recommends Fellowship, Professorship, Visiting researcher and Consortium awards. It is composed of independent external senior scientists who gather once a year in June to analyse applications and the scientific reviews provided by a pool of a thousand experts. They finalize the selection of the Smart Loire Valley General Programme Awards. The Scientific Council members are also regularly consulted for their expertise to perform independent evaluations in the course of required recruitments occurring across the Ambition Research Development 2020 and CVL programmes.

For the campaign and call for applications 2021, LE STUDIUM Scientific Council members were:

PRESIDENT

Dominique LANGEVIN

Research Director in physical chemistry, Centre National de Recherche Scientifique, Laboratory of Solid State Physics at the University of Paris-Sud - FR

MEMBERS

Dominique ALLART

Professor, Director of Service d'Histoire et Technologie des Arts plastiques (Temps modernes), Université de Liège - BE

Josep-Maria ARAUZO-CAROD

Professor, Director of the Center for Research in Economics and Sustainability, University of Rovira i Virgili - ES

Laura BACIOU

Professor, Biophysicist, Laboratory of Physical Chemistry at the University of Paris-Sud - FR

Jean-Claude BERNIER

Professor, Chemistry and Interfaces in Physics and Biology, Strasbourg - FR

Françoise BUREL

Research Director in Ecosystems, Biodiversity, Evolution, Centre National de Recherche Scientifique & University of Rennes - FR

Gordon CAMPBELL

Professor in Renaissance and seventeenth century studies, University of Leicester - UK

Marc DRILLON

Research Director in Materials Sciences, Centre National de Recherche Scientifique, Institut de Physique et de Chimie des Matériaux de Strasbourg - FR

Mark GOERBIG

Professor Theoretical Physics, CNRS Research Director, Laboratoire de Physique des Solides, Université Paris-Sud, Saclay - FR

Marc GOUJON

Social and Human Sciences, Centre National de Recherche Scientifique - FR

Olga GUERRERO-PEREZ

Professor, Environmental chemistry & Chemical Engineering, Higher Technical School of Industrial Engineering, University of Malaga - ES

Aylin Carla HANYALOGLU

Doctor in Molecular Biology, Imperial College London, Faculty of Medicine - UK

David HULMES

Emeritus Research Director, Centre National de la Recherche Scientifique, Tissue Biology and Therapeutic Engineering Laboratory, Lyon - FR

Piotr LAIDLER

Professor of Biochemistry, Chair of Medical Biochemistry, Jagiellonian University Medical College, Krakow - PL

Jean-Claude LECRON

Professor in Renaissance and seventeenth century studies, University of Poitiers, Hospital practitioner at the University Hospital of Poitiers - FR

Federica MIGLIARDO

Professor, Biophysicist, Università degli Studi di Messina, Italy / Institut de Biologie Intégrative de la Cellule, CNRS, Saclay - FR

John O'BRIEN

Professor, Director of Studies in the School of Modern Languages and Cultures, Durham University - UK

David OGDEN

Research Director, Laboratory of Brain Physiology and Biophysics, University Paris-Descartes, Paris - FR

Alain PAVE

Professor, Biometrics and Evolutionary Biology, Lyon. Member of the Academy of Technologies - FR

Alain PRIOU

Professor, Physics, University Paris Ouest Nanterre La Défense - FR

Sébastien ROSE

Professor, Physics, Université Paris Ouest Nanterre La Défense - FR

Jean-Pierre SAMAMA

Research Director in Biophysics, Centre National de Recherche Scientifique, Synchrotron Soleil - FR

Laurent TISSOT

Professor, Contemporary history, University of Neuchâtel - CH

Emmanuel TRELAT

Professor, Mathematics, Sorbonne University, Director of the Mathematical Sciences Foundation in Paris - FR

Brigitte VALLÉE

Research Director, Computer Sciences and Mathematics, Centre National de Recherche Scientifique and University of Caen - FR

Ralph WATZEL

Professor, Geology and geophysics, President of the Federal Institute for Geosciences and Natural Resources (BGR), Hannover - DE

PERMANENT GUESTS: REPRESENTATIVES OF UNIVERSITIES, RESEARCH ORGANISATIONS AND REGIONAL INSTITUTIONS

Anne BESNIER

Vice-President Higher Education and Research, Region Centre-Val de Loire

Pascal BONNET

Vice-President Research, University of Orléans

Nicolas DUBOULOZ

Director of Higher Education, Research and Technology Transfer, Region Centre-Val de Loire

Nicolas GASCOIN

Director INSA Centre-Val de Loire

Marc GUERIN

President Centre INRAE Val-de-Loire

Ludovic HAMON

CNRS Regional Delegate Centre Limousin-Poitou-Charentes

Emmanuelle HUVER

Vice-President Research, University of Tours

Hélène PAUWELS

Research Branch, BRGM, Orléans

Mustapha SI-TAHAR

Inserm Scientific Correspondent

LE STUDIUM

Yves-Michel GINOT

President

Sophie GABILLET

General Secretary

Aurélien MONTAGU

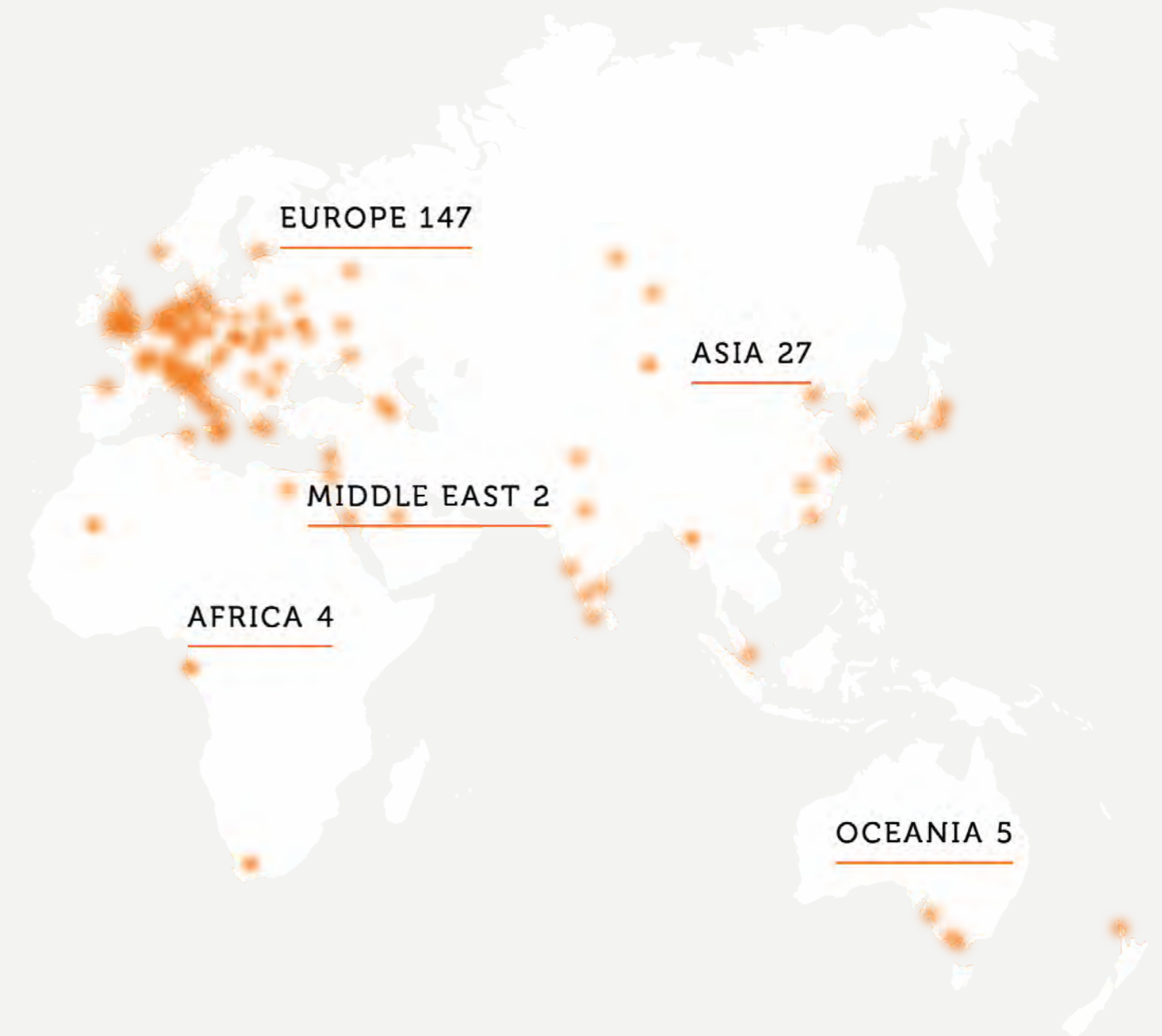
Scientific Relations Manager

ORIGIN OF LE STUDIUM RESEARCH FELLOWS

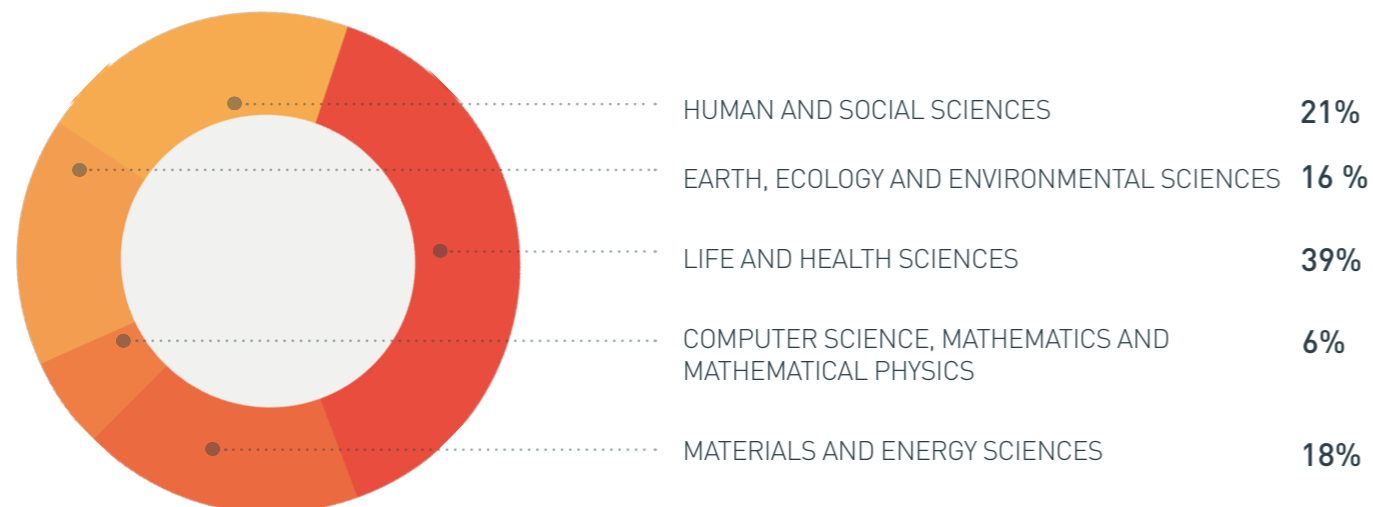


**247 RESEARCHERS
FROM 47 COUNTRIES
RESEARCH FELLOWS**

IN THE CENTRE-VAL DE LOIRE REGION SINCE 1996

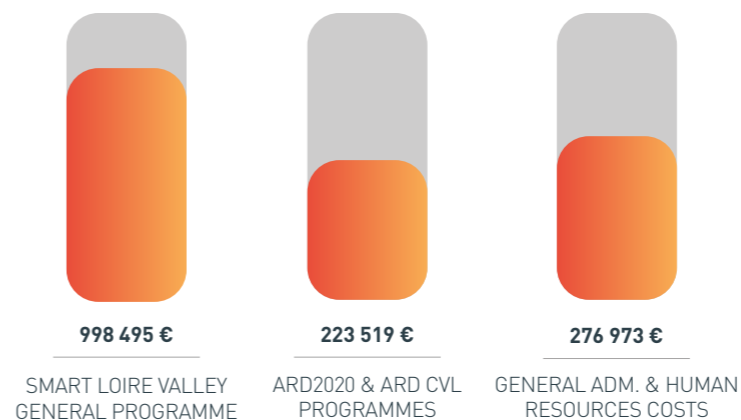


THEMATICS REPARTITION SINCE 1996



2021 FINANCIAL DATA

2021 EXPENDITURES REPARTITION



2021 FINANCIAL RESOURCES

REGION CENTRE VAL DE LOIRE	54%
EUROPEAN FUNDS	28%
UNIVERSITY OF TOURS	5%
UNIVERSITY OF ORLEANS	5%
ORLEANS METROPOLE	4%
PRIVATE CONTRIBUTIONS	1%
VARIOUS	3%

2021 EVENTS PANORAMA

2021

JANUARY

- 7 Jan ● **Socio-cultural history of international lawyers**
Dr Raphaël Cahen
Virtual meeting
- 7 Jan ● **Terrestrial analogues in the search for life on Mars**
Dr Barbara Cavalazzi
Virtual meeting
- 20-21 ● **Managing riverscapes and flow regimes for biocultural diversity**
Dr Rebecca Tharme & Prof. Karl Matthias Wantzen
Virtual meeting

FEBRUARY

- 4 Feb ● **Modeling of reactive plasmas for nanoparticle synthesis**
Prof. Igor Denysenko
Virtual meeting
- 4 Feb ● **Images of the search for happiness in African Literature**
Prof. Maria Teresa Salgado Guimarães da Silva
Virtual meeting

MARCH

- 4 Ma ● **Towards a better understanding of order and disorder in inorganic materials with solid-state NMR spectroscopy**
Dr Laura Piveateau
Virtual meeting
- 4 Ma ● **A bottom-up plasma process to fabricate "solid-gas" nanocomposite layers: New materials and applications**
Prof. Asunción Fernandez
Virtual meeting
- 23-24 ● **Innate immunity in a biomineralized context : trade-offs or synergies ?**
Prof. Maxwell Hincke & Dr Sophie Rehault-Godbert
Virtual meeting

APRIL

- 1 Apr ● **Baculovirus: an entomopathogenic virus with high potential as biological pest control agents**
Dr Maria-Cristina Del Rincon-Castro
Virtual meeting
- 1 Apr ● **The music in the collegiate, later cathedral church of Our Lady in Antwerp (c. 1370 – 1530): a mirror of international prosperity?**
Prof. Eugeen Schreurs
Virtual meeting
- 6 Apr ● **Pharmacological targeting of cathepsin C: a key therapeutic target in chronic inflammatory and auto-immune diseases**
Dr Brice Korkmaz
Virtual meeting
- 23 Apr ● **Tout ce que vous avez toujours voulu savoir sur les coronavirus, sans jamais oser le demander**
Dr Bertrand Castaing
Virtual meeting

MAY

- 6 May ● **Exploring the soundscape of Royal entries in the early Modern period**
Dr Esperanza Rodríguez-García
Virtual meeting
- 6 May ● **From co-colonization interactions to emergent system dynamics in multi-strain systems**
Dr Erida Gjini
Virtual meeting

JUNE

- 15-17 ● **Challenges and opportunities in materials for green energy production and conversion**
Dr Edurne Serrano-Larrea, Dr Conchi Ania & Dr Encarnacion Raymundo Pintero
Virtual meeting
- 28 ● **53rd Annual Meeting of the Society for Invertebrate Pathology**
Dr Cristina Del Rincon Castro & Dr Elisabeth Herniou
Virtual meeting

JULY

- 1 July ● **Images of Justice and the public stage-management of capital punishment (1350-1600)**
Dr Valérie Hayaert
Hôtel Dupanloup

AUGUST

- 30 Aug ● **Pharmacological targeting of cathepsin C: a key therapeutic target in chronic inflammatory and auto-immune diseases**
Dr Brice Korkmaz
Virtual meeting

SEPTEMBER

- 1 Sept ● **Music and Lived Religion in the Collegiate Church of Our Lady in Antwerp (1370 - 1566). A Multidisciplinary Study in a European context**
Prof. Eugeen Schreurs & Prof. Philippe Vendrix
CESR, Tours
- 10 ● **Targeting synaptic dysfunction using antisense RNA enhancers neurodegenerative diseases**
Dr Kathia Zaleta
Faculté de Droit, Tours
- 10 ● **Museums during COVID-19: the sweet hereafter?**
Dr Alexandre Vanautgaerden
Faculté de Droit, Tours
- 15-17 ● **Law(s) and International relations : actors, institutions and comparative legislations**
Dr Raphaël Cahen & Prof. Pierre Allorant
Hôtel Dupanloup & Maison de l'Avocat, Orléans
- 15 ● **Conquérir la paix : des Lumières à l'Union européenne**
Prof. Stella Ghervas
Hôtel Dupanloup, Orléans

OCTOBER

- 07 Oct ● **Natural deep eutectic solvents: A green way to valorize plant products for cosmetic applications**
Dr Duangjai Tungmannithum
Cosmetic Valley, Chartres
- 11-12 ● **Justice en scène(s)**
Dr Valérie Hayaert & Dr Stéphane Geonget
Palais de Justice & Musée des Beaux Arts de Tours

NOVEMBER

- 1 Sept ● **A perspective of research. Food and documents from the Middle Ages to the Renaissance**
Dr Francesca Pucci-Donati
La villa Rabelais, Tours
- 10 ● **Introduction, Breeding, Propagation and Deployment of Pacific Northwest Conifers Around the World: 70 years of Progress, Opportunities and Challenges**
Réseau MiDi & IUFRO
Virtual meeting
- 10 ● **New approaches to get around roundworms**
Dr Alexandre Vanautgaerden
Faculté de Droit, Tours
- 15-17 ● **Law(s) and International relations : actors, institutions and comparative legislations**
Prof. Adrian Wolstenholme, Prof. Georg von Samson-Himmelstjerna & Dr Cédric Neveu
Virtual meeting
- 15 ● **De la séduction à l'agression ? La question du harcèlement**
Dr Robert Courtois
Université de Tours

DECEMBER

- 7 Oct ● **Groundwater contamination by Non-Aqueous Phase Liquids (NAPL)**
Dr Behzad Ataie-Ashtiani
BRGM, Orléans
- 13-17 ● **Exploration of duality, geometry and entanglement 2nd meeting**
Prof. Sergey Solodukhin
Université de Tours Faculté des Sciences et Techniques

Themes in color

- CONFERENCE
- PUBLIC LECTURE
- THURSDAY
- SUMMER SCHOOL
- RENCONTRE LEONARDO
- CONSORTIUM
- AFFILIATED EVENT
- EXPERT DAY
- WORKSHOP

LIST OF RESEARCHERS IN RESIDENCE IN 2021

SMART LOIRE VALLEY GENERAL PROGRAMME

DR RAPHAËL CAHEN

Sociological and Cultural History of International Law (1815-1871)

September 2020 – October 2021

In residence at: POLEN (POuvoirs, LEttres, Normes), CNRS, Université d'Orléans

Host scientist: Prof. Pierre Allorant

DR BARBARA CAVALAZZI

Analogues in the search for life on Mars

October 2020 – October 2021

In residence at: Centre de Biophysique Moléculaire, CNRS

Host scientist: Dr Frances Westall

DR MARÍA-CRISTINA DEL RINCON-CASTRO

Genomic characterisation of six Mexican baculovirus strains with activity against spodoptera frugiperda (Lepidoptera: noctuidae)

October 2020 – October 2021

In residence at: Institut de Recherche sur la Biologie de l'Insecte (IRBI), Université de Tours, CNRS

Host scientist : Dr Elisabeth Herniou

DR JEAN-FRANÇOIS DELUCHEY

At the margins of neoliberal governmentality: the extermination of peripheral youth in the Brazilian Amazon region

January 2020 – July 2021

In residence at: Interactions culturelles et discursives (ICD) / Université de Tours

Host scientist: Dr Nathalie Champroux

PROF. IGOR DENYSENKO

Modeling of reactive plasmas for nanoparticle synthesis

January 2021 – March 2021

In residence at: Groupe de Recherches sur l'Energétique des Milieux Ionisés (GREMI) / CNRS, Université d'Orléans

Host scientist: Dr Maxime Mikikian

PROF. ASUNCIÓN FERNANDEZ

Magnetron sputtering deposition with He as process gas: Understanding the formation of nanostructured / nano-porous thin films

January 2021 – March 2021

In residence : Groupe de Recherches sur l'Energétique des Milieux Ionisés (GREMI) / CNRS, Université d'Orléans

Host scientist : Dr Anne-Lise THOMANN

PROF. ERIDA GJINI

Coexistence near neutrality

March 2021 – July 2021

In residence : Institut Denis Poisson (IDP) / Université d'Orléans, Université de Tours, CNRS – FR

Host scientist : Dr Sten MADEC

DR VALÉRIE HAYAERT

Justitiart. Images of justice: a European survey of legal symbolism

September 2020 – October 2021

In residence at: Centre d'Études Supérieures de la Renaissance, CNRS, Université de Tours

Host scientist: Dr Stephan Geonget

MR ABDULLAH KHAN

Art & Science: a synthesis

September 2021 – October 2021

In residence at: Conditions Extrêmes et Matériaux : Haute Température et Irradiation (CEMHTI) / CNRS

Host scientist: Dr Lavinia Balan

DR LAURA PIVETEAU

NMR study of disordered inorganic materials using spin diffusion

September 2019 – September 2021

In residence at: Conditions Extrêmes et Matériaux : Haute Température et Irradiation (CEMHTI) / CNRS

Host scientist: Dr Dominique Massiot

DR FRANCESCA PUCCI DONATI

NMR study of disordered inorganic materials using spin diffusion

September 2021 – December 2021

In residence at: Centre d'Études Supérieures de la Renaissance (CESR) / CNRS, Université de Tours & European Institute for the History and Cultures of Food (IEHCA) / La Villa Rabelais

Host scientist: Prof. Bruno Lauriou

DR BARBARA REAVES

Intracellular trafficking of anthelmintic drug targets and its contribution to drug resistance

September 2020 - December 2021

In residence at: Infectiologie et Santé Publique (ISP) / Centre INRAE Val de Loire, Université de Tours

Host scientist: Dr Cédric Neveu

DR ESPERANZA RODRIGUEZ-GARCIA

Experiencing Historical Soundscapes: the Royal Entries of Emperor Charles V in Iberian Cities

September 2020 – August 2022

In residence at : Centre d'Études Supérieures de la Renaissance (CESR) / CNRS, Université de Tours

Host scientist: Dr David Fiala

PROF. MARIA TERESA SALGADO

Leda Rios - A voice comes out of silence in Brazil

January, 2021 to January, 2022

In residence at : RÉceptions et MÉdiations de Littératures et de Cultures Étrangères et comparées (RÉMÉLICE) / Université d'Orléans

Host scientist: Prof. Catherine Pelage

PROF. EUGEN SCHREURS

Music in the collegiate church of our lady in Antwerp (C.1370 - C.1530): A European hub?

September 2020 – October 2021

In residence at: Centre d'Études Supérieures de la Renaissance (CESR) / CNRS, Université de Tours

Host scientist: Prof. Philippe Vendrix

DR CORNELIU SERGIU STAN

Carbon nanomaterials as solar UV protectors targeting applications ranging from paints/varnishes to pharma/cosmetic products

November 2021 - October 2022

In residence at: Conditions Extrêmes et Matériaux : Haute Température et Irradiation (CEMHTI) / CNRS

Host scientist: Dr Conchi Ania

DR ALEXANDRE VANAUTGAERDEN

Museion. From space to place : rebuilding memory institutions

October 2020 – October 2021

In residence at: Centre d'Études Supérieures de la Renaissance (CESR) / CNRS, Université de Tours

Host scientist: Prof. Benoist Pierre

DR JEAN-PAUL VERNIER

Impacts of Pollution, Volcanoes and Wildfires on the Earth's Middle Atmosphere

November 2021 - January 2022

In residence at: Laboratoire de Physique et Chimie de l'Environnement et de l'Espace (LPC2E) / CNRS, Université d'Orléans, CNES

Host scientist: Dr Gwenaël Berthet

ARD 2020 BIOPHARMACEUTICALS PROGRAMME

DR GRÉGORY GUIRIMAND

Bio-production of vindoline and catharanthine by recombinant yeast cell factories

June 2019 – March 2021

In residence at : Laboratoire Biomolécules et Biotechnologies Végétales (BBV), Université de Tours

Host scientist : Dr Vincent Courdavault

ARD CVL COSMETOSCIENCES PROGRAMME

DR DUANGJAI TUNGMUNNITHUM

Natural deep eutectic solvents (NaDES): Cosmetics in the Age of Green Technologies

September 2021 - August 2022

In residence at : Laboratoire de Biologie des Ligneux et des Grandes Cultures (LBLGC) / INRAE, Université d'Orléans

Host scientist : Dr Christophe Hano

ARD 2020 LAVOISIER PROGRAMME

DR ARUNABH GHOSH

Design, formulation and characterisation of new safer electrolytes for electrochemical storage of energy

February 2019 – January 2021

In residence at : Laboratoire de Physico-Chimie des Matériaux et des Electrolytes pour l'Energie (PCM2E) / Université de Tours

Host scientist : Pr Fouad Ghamouss

PROF. ADRIAN WOLSTENHOLME

Further development of caenorhabditis elegans as a tool for studying drug targets in parasitic nematodes

September 2020 – October 2021

In residence at: Infectiologie et Santé Publique (ISP) / Centre INRAE Val de Loire, Université de Tours

Host scientist: Dr Cédric Neveu

DR KATHIA ZALETA

Mechanisms of glass crystallization analyzed by electron backscatter diffraction (EBSD)

November 2020 – October 2021

In residence at: Imagerie et Cerveau (IC) / INSERM, Université de Tours

Host scientist: Prof Patrick Vourch

DR ILLIA ZYMAK

CosmOrbitrap - high resolution mass spectrometer for space application

January 2020 – August 2021

In residence at: LPC2E Laboratoire de Physique et Chimie de l'Environnement et de l'Espace, CNRS, Université Orléans, CNES

Host scientist: Dr Christelle Briois

ARD 2020 PIVOTS PROGRAMME

DR BEHZAD ATAIE-ASHTIANI

Modelling multiphase flow of immiscible fluids in highly permeable porous media for soil remediation

May 2021 – December 2021

In residence at : Bureau de recherches géologiques et minières (BRGM)

Host scientist : Dr Hossein Davarzani & Dr Mohamed Azaroual

SMART LOIRE VALLEY GENERAL PROGRAMME AWARDS - SELECTION OF CAMPAIGN 2021

LE STUDIUM VISITING RESEARCHER

DR FRANCISKA VIDANE ERDO

Knowledge transfer on Raman spectroscopy and skin-on-a-chip technology to study transdermal drug delivery

From : Pázmány Péter Catholic University - Hungary
Host scientist : Dr Franck Bonnier
Nanomédicaments et Nanosondes (MNMS),
Université de Tours

DR MARIA SOLEDAD LEONARDI

Adaptations to deep diving in seal lice, the exception to the rule that there are no marine insects

From : Institute of Biology of Marine Organisms (IBIOMAR) - Argentina
Host scientist : Prof. Claudio Lazzari
Insect Biology Research Institute (IRBI), University of Tours / CNRS - FR

DR ALBERTO MARZO

The role of haemodynamics in intracranial bifurcation arteries after aneurysm treatment with flow-diverting stents

From : University of Sheffield - United Kingdom
Host scientist : Dr Ayache Bouakaz
Inserm Imaging and Brain, INSERM, Université de Tours

PROF. LUKE O'DELL

Understanding sodium batteries using advanced and operando magnetic resonance methods

From : Deakin University - Australia
Host scientist : Prof. Michaël Deschamps
Conditions Extrêmes et Matériaux : Haute
Température et Irradiation (CEMHTI) / CNRS

PROF. RHEA PAUL

Development of a Multi-lingual Tool for Identifying Child Language Disorders

From : Sacred Heart University - USA
Host scientist : Dr Sandrine Ferre
Imagerie et Cerveau (IC) / INSERM, Université de Tours

DR FRANCESCA PUCCI-DONATI

Food trade and professions in the Loire Valley during the Renaissance. A preliminary research

From : University of Bologna - Italy
Host scientist : Prof. Bruno Laurioux
Centre d'Études Supérieures de la Renaissance (CESR) / CNRS, Université de Tours - Institut Européen d'Histoire et des Cultures de l'Alimentation (IEHCA) / La Villa Rabelais

PROF. RITA SINGH

Interaction between the FSH receptor and insulin receptor substrates (IRS-1 and IRS-2) in the pathophysiology of the polycystic ovary syndrome

From : University of Delhi - India
Host scientist : Dr Pascale Crépieux
Physiology of Reproduction and Behaviors, INRAE, CNRS, Université de Tours, IFCE

DR ANNE-SOPHIE SERGENT

Modelling tree drought vulnerability in the andean patagonian forest

From : CONICET - National Scientific and Technical Research Council - Argentina
Host scientist : Dr Philippe Rozenberg
Biofora, INRAE

DR JEAN-PAUL VERNIER

Impacts of Pollution, Volcanoes and Wildfires on the Earth's Middle Atmosphere

From : NASA Langley Research Center - USA
Host scientist : Dr Gwenaél Berthet
Laboratoire de Physique et Chimie de l'Environnement et de l'Espace (LPC2E) / CNRS, Université d'Orléans, CNES

LE STUDIUM RESEARCH FELLOWSHIP

PROF. STEPHEN FOSTER

Stable isotope methods for insect physiology

From : North Dakota State University - USA
Host scientist : Prof. Jérôme Casas
Institut de Recherche sur la Biologie de l'Insecte (IRBI) / Université de Tours, CNRS

DR MICHAL KORENKO

Molten Salt Synthesis and Characterization of (Oxo)-(Fluoro)-Aluminates for Electrochemical and Electronic/Photonic Applications

From : Slovak Academy of Sciences - Slovakia
Host scientist : Dr Mathieu Allix
Haute Température et Irradiation (CEMHTI) / CNRS

DR ALBERTO CAMPAGNOLO

From Features to Data Points & Pixels: Investigations into the Transmediation of the Artefactual Nature of Books in the Digital

From : University of Udine - Italy
Host scientist : Prof. Elena Pierazzo
Centre d'Études Supérieures de la Renaissance (CESR) / CNRS, Université de Tours

DR DAVID CROTTE

Investigating the heterogeneity of the crosstalk between cancer cells and the tumor micro-environment using calcium profiling

From : University of California, San Francisco - USA
Host scientist : Prof. Christophe Vandier
Nutrition, Croissance et Cancer (N2C) / INSERM, Université de Tours

PROF. JUAN CESAR VILARDI

Adaptive Strategies of Forest Trees to Climate Changes: Microevolution and Plasticity

From : University of Buenos Aires - Argentina
Host scientist : Dr Philippe Rozenberg
BioForA / Centre INRAE Val de Loire, ONF

PROF. CHRISTINE ROUSSELLE

Ammonia for valuable clean energy systems

PRISME / INSA Centre Val de Loire, Université d'Orléans

DR ROCK OUIMET

Application of the critical biomass harvesting concept for improving the diagnosis of soil sensitivity to forest biomass harvest

From : Ministère des Forêts, de la Faune et des Parcs du Québec - Canada
Host scientist : Dr Nathalie Korboulewsky
Unité de Recherche Ecosystèmes Forestiers (EFNO) - Nogent sur Vernisson

DR SALIM OK

Investigations on Confinement Effect on Polymers

From : Kuwait Institute for Scientific Research - Kuwait
Host scientist : Dr Nathalie Korboulewsky
Interfaces, Confinement, Matériaux et Nanostructures (ICMN) / CNRS, Université d'Orléans

DR CORNELIU SERGIU STAN

Carbon nanomaterials as solar UV protectors targeting applications ranging from paints/varnishes to pharma/cosmetic products

From : Gheorghe Asachi Technical University of Iasi - Romania
Host scientist : Dr Conchi Ania
Conditions Extrêmes et Matériaux : Haute Température et Irradiation (CEMHTI) / CNRS

LE STUDIUM RESEARCH PROFESSORSHIP

PROF. JILL HEATHCOCK

Adding Movement Analysis to Detect Neurodevelopmental Impairments in Infants of Obese Mothers

From : The Ohio State University - USA
Host scientist : Prof. Frédérique Bonnet-Brilhault
Imagerie et Cerveau (IC) / INSERM, Université de Tours d'Orléans, CNRS

LE STUDIUM RESEARCH CONSORTIUM

DR TJARDA ROBERTS

H'allo Volcano ! : An interdisciplinary study on the atmospheric plume processing and impacts of Volcanic Halogen Emissions

Laboratoire de Physique et Chimie de l'Environnement et de l'Espace (LPC2E) / CNRS, Université d'Orléans, CNES

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LE STUDIUM

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