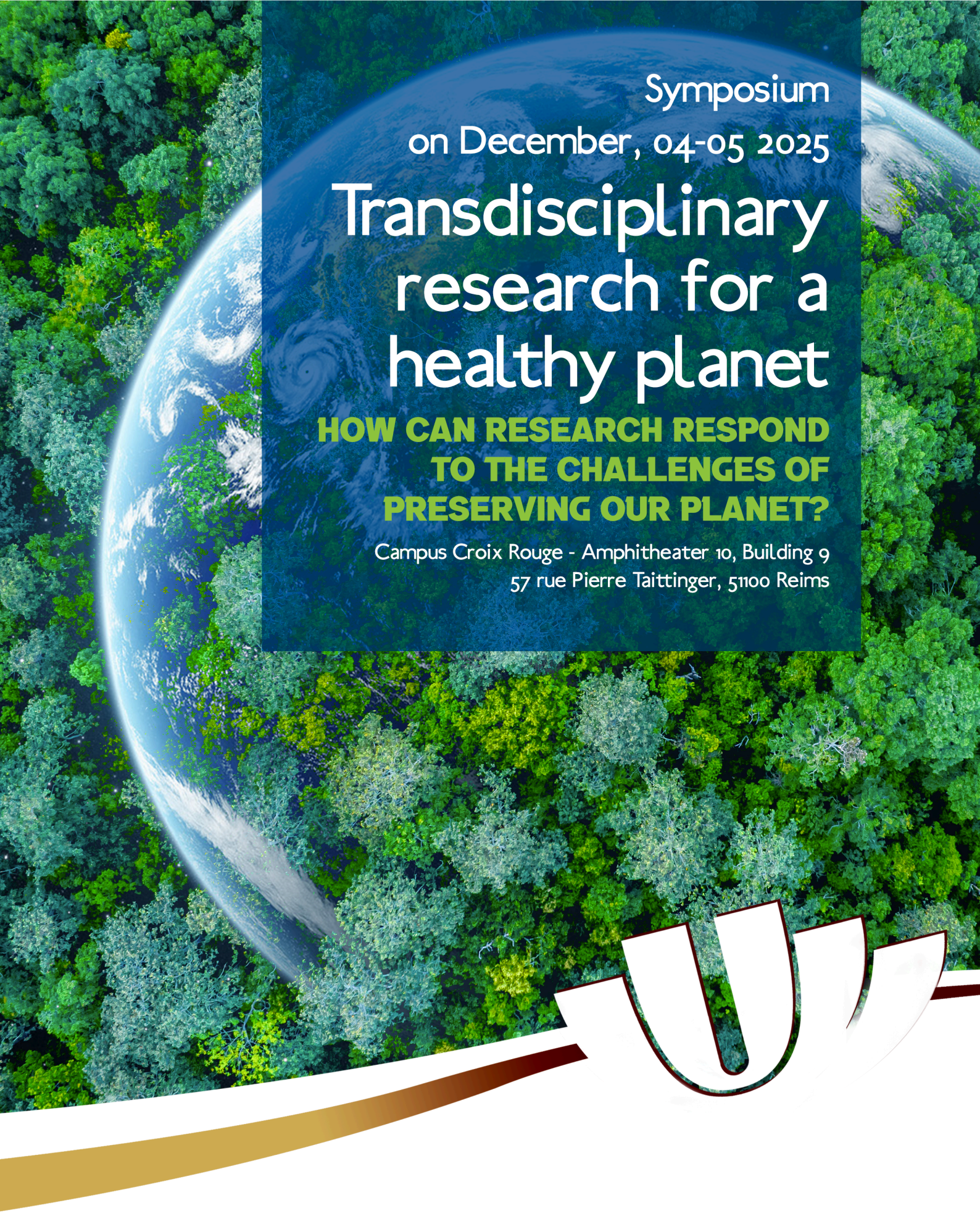


Symposium

on December, 04-05 2025

Transdisciplinary research for a healthy planet

HOW CAN RESEARCH RESPOND TO THE CHALLENGES OF PRESERVING OUR PLANET?

Campus Croix Rouge - Amphitheater 10, Building 9
57 rue Pierre Taittinger, 51100 Reims

PROGRAMME & ABSTRACTS

UNIVERSITÉ DE REIMS CHAMPAGNE-ARDENNE

SUMMARY

PROGRAMME

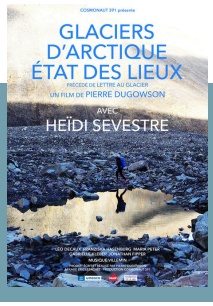
DAY 1: DECEMBER 4, 2025

9:00 am - 09:30 am: Welcoming coffee

9:30 am - 10:00 am: Official welcome

10:00 am - 12:00 pm: Opening film

Screening of the film "Glaciers d'Arctique, état des lieux"
by Pierre Dugowson, with Heïdi Sevestre,
followed by a dialogue with the film director



12:00 pm - 1:00 pm: Lunch break

1:00 pm - 2:30 pm: Poster session

2:30 pm - 3:00 pm: "When arts meet sciences"

Conversation between Anaïs Tondeur and Rozenn Canevet around the exhibitions "La nuit obscure de l'âme végétale" and "Le rêve des tourbières" as part of the *EarthKeepingEarthShaking (EKES)* research program

3:00 pm - 5:40 pm: Session on "Human-Nature Relationship"

Introduction

3:10 pm - 3:50 pm: Dr. Anne-Caroline Prévot

CNRS Research Director, Muséum national d'Histoire naturelle
Ecologist specialised in conservation biology at the interface with social sciences (conservation psychology)

Coffee break

4:20 pm - 5:00 pm: Dr. Jean-Baptiste Fressoz

CNRS Senior Researcher - Ecole des Hautes Etudes en Sciences Sociales
Historian specialised in environmental history and climate knowledge, the Anthropocene and the energy transition

5:00 pm - 5:40 pm: Dr. Bathsheba Demuth

Dean's Associate Professor, Brown University
Environmental historian specialised in the lands and seas of the Russian and North American Arctic

6:00 pm - 7:30 pm: Inauguration of the exhibitions "La nuit obscure de l'âme végétale" and "Le rêve des tournières"

An exhibition by photographer Anaïs Tondeur and students of ÉSAD mentored by Rozenn Canevet as part of the EKES program.
Robert de Sorbon Library, Croix-Rouge Campus, Reims

8:30 pm - 10:30 pm : Reception at Reims City Hall - *Limited capacity*

DAY 2: DECEMBER 5, 2025

9:30 am - 9:40 am: Opening speech

9:40 am - 11:50 am: Session on “Nature-Based Solutions”

Introduction

9:50 am - 10:30 am: Pr. Daniel Gilbert
Professor, University of Bourgogne Franche-Comté
Ecologist specialised in microbial ecology of wetlands

10:30 am - 11:10 am: Dr. Jonathan Lenoir
CNRS Research Officer, Picardie Jules Verne University
Ecologist specialised in forestry ecology

11:10 am - 11:50 am: Pr. Jan Bebbington
Professor, Lancaster University
Professor in accounting specialised in ecological accounting

12:00 pm - 1:00 pm: Lunch break

1:00 pm - 2:30 pm: Poster session

2:30 pm - 3:30 pm: Closing conference

Dr. Philippe Grandcolas
CNRS Research Director, Muséum national d’Histoire naturelle
Scientific Deputy Director of “CNRS Ecologie et Environnement”, IPBES Observer
Ecologist specialised in the evolutionary biology of biodiversity

3:30 pm - 4:30 pm: Poster Awards
Award ceremony for the top three posters, followed by flash presentations by the winners

4:30 pm - 4:45 pm: Closing speech

5:00 pm: Closing cocktail

SPEAKERS BIOGRAPHIES

GUEST SPEAKER OF THE PLENARY CONFERENCE

PIERRE DUGOWSON

FILM DIRECTOR

In collaboration with glaciologist Heïdi Sevestre, he produced, wrote and directed HEÏDI'S ICE in 2023, broadcasted on LCP-AN and TV5Monde, a documentary exploring Arctic glaciers and the impacts of climate change on these threatened ecosystems.

He continued this work in 2025 with "Glaciers d'Arctique, état des lieux", a feature documentary released in cinemas in October 2025, which documents the accelerating melt of Arctic glaciers and its global consequences, following scientists in the field.

On the fiction side, LES FEMMES ET LES ENFANTS D'ABORD ("Women and Children First") was released in May 2025. This comedy, composed of ten short films shot between 2014 and 2024, tackles major social and environmental issues facing our society (2030, Leçon de choses, Dinosaure, Conte sauvage, Plastic shopper...) and features Nicole Ferroni, Ophelia Kolb, Solène Rigot, Théo Cholbi, amongst others.

In parallel, he develops a committed photographic practice with his series ACTIVISM WORKS, highlighting activists involved in climate and biodiversity action.

ANAÏS TONDEUR

PHOTOGRAPHER

Anchored in ecology thought, Anaïs Tondeur searches for a new form of political art. Crossing natural sciences and anthropology, myth making and new media processes, she creates speculative narratives and engages on investigations through which she experiments other conditions of being to the world. Working with photographies, installations, or videos, she seeks a new aesthetic, in the sense of a renewal of our modes of perception, and explores beyond the separation between nature and culture, other modes of relationships with humans and other than humans.
Graduate from Central Saint Martin (2008) and Royal College of Arts (2010) in London, she has presented and exhibited her work in international institutions such as the Center Pompidou (Paris - FR), Serpentines Galleries (London - UK), Bozar (Brussels - BE), French Pavilion "Lieux Infinis" Biennale Di Venezia (Venezia - IT), Kröller-Müller Museum (Netherlands), Dortmunder U Museum für Kunst und Gewerbe (Dortmund - DE), Spencer art Museum (Lawrence - USA), Choi Center (Beijing - CN), Nam June Paik Art Center (Seoul - KR).

ROZENN CANEVET

TEACHER OF ART HISTORY AND ART THEORY
AT REIMS HIGHER SCHOOL OF ART AND DESIGN (ESAD)

Rozenn Canevet holds a PhD in Aesthetics and is an art critic. She teaches art theory and history at the École Supérieure d'Art et de Design de Reims, where she also directs the research programs of the Master's in Art. In this context, she edited the volume Artist-Run Spaces Around and About (Les presses du réel, 2018). Since 2020, she has been developing the research program EKES (EarthKeeping EarthShaking), which investigates ecofeminisms, Earth rights, and ecological vitality in contemporary art. She also directs the eponymous EKES collection in Art and Social Sciences (ÉSAD de Reims, Les presses du réel). Additionally, she has been regularly teaching at the École nationale supérieure du paysage de Versailles since 2017.

DR. ANNE-CAROLINE PRÉVOT

CNRS RESEARCH DIRECTOR,
MUSÉUM NATIONAL D'HISTOIRE NATURELLE
ECOLOGIST SPECIALISED IN CONSERVATION BIOLOGY AT THE INTERFACE
WITH SOCIAL SCIENCES (CONSERVATION PSYCHOLOGY)

Anne-Caroline Prévot is an ecologist, CNRS Research Director at the Centre for Ecology and Conservation Sciences (CESCO) at the National Museum of Natural History in Paris. Her work lies at the intersection of conservation biology, conservation psychology, and other social sciences, with a particular interest in the relationships individuals maintain with nearby nature and the ways in which collective narratives can be constructed to support ecological and social transitions. She currently conducts several research projects with students and artists, to explore (i) the diversity of individual experiences of nature (notably with children); (ii) the diversity of nature integration in popular fictions. Anne-Caroline Prévot is a graduate of the École Normale Supérieure (ENS) on rue d'Ulm (1990–1994), holds a PhD in ecology from the University of Montpellier II (1993), and obtained her Habilitation to Direct Research (HDR) from the University of Paris-Sud (2005). She served as a lecturer at the IUFM of Versailles before joining the CNRS in 2009.

DR. JEAN-BAPTISTE FRESSOZ

CNRS SENIOR RESEARCHER - ECOLE DES HAUTES ETUDES EN SCIENCES SOCIALES
HISTORIAN SPECIALISED IN ENVIRONMENTAL HISTORY AND CLIMATE KNOWLEDGE,
THE ANTHROPOCENE AND THE ENERGY TRANSITION

Jean-Baptiste Fressoz is a French historian of science, technology, and the environment. As a former student at the École normale supérieure of Cachan, he completed a thesis in history at the École des hautes études en sciences sociales (EHESS) and the European University Institute in Florence, Italy. He was a lecturer at Imperial College London, and he is currently a senior researcher at the CNRS, a statutory member of the Centre de recherches historiques of EHESS and professor at the École Nationale des Ponts et Chaussées.

His work focuses on environmental history, climate knowledge, the Anthropocene, and the energy transition. He is the author of several books, including Happy apocalypse (2012), Shock of the Anthropocene (2013, co-written with Christophe Bonneuil), Chaos in the heavens (2020, co-written with Fabien Locher) and More and more and more (2024), in which he deconstructs the linear narrative of the energy transition. He also writes a monthly column for the daily newspaper Le Monde.

DR. BATHSHEBA DEMUTH

DEAN'S ASSOCIATE PROFESSOR, BROWN UNIVERSITY
ENVIRONMENTAL HISTORIAN SPECIALISED IN THE LANDS AND SEAS
OF THE RUSSIAN AND NORTH AMERICAN ARCTIC

Bathsheba Demuth is the Dean's Associate Professor of History and Environment and Society at Brown University, where she specializes in the lands and seas of the Russian and North American Arctic. Her multiple-prize winning first book, Floating Coast: An Environmental History of the Bering Strait (W.W. Norton) was named a Nature Top Ten Book of 2019 and Best Book of 2019 by NPR, Kirkus Reviews, and Library Journal among others. Demuth holds a BA and MA from Brown University, and an MA and PhD from the University of California, Berkeley. Her writing has appeared in publications from The American Historical Review to The New Yorker.

PR. DANIEL GILBERT

PROFESSOR, UNIVERSITY OF BOURGOGNE FRANCHE-COMTÉ
ECOLOGIST SPECIALISED IN MICROBIAL ECOLOGY OF WETLANDS

Daniel Gilbert is a Professor of Ecology at the Université Marie et Louis Pasteur. As a specialist in peatlands, he conducts research into the ecology and economics of carbon, with a view to certifying wetland restoration projects. In this context, he is leading an inventory of French peatlands, their carbon stocks and their state of degradation. He is also director of the UMR CNRS Chrono-environment and the Zone Atelier Arc Jurassien.

DR. JONATHAN LENOIR

CNRS RESEARCH OFFICER,
PICARDIE JULES VERNE UNIVERSITY
ECOLOGIST SPECIALISED IN FORESTRY ECOLOGY

Jonathan Lenoir is a CNRS researcher in Ecology & Biostatistics broadly interested in the ecological dynamics associated with spatial and temporal global changes, with particular emphasis on the biotic responses to contemporary climate change. His research interests range from broad-scale patterns of biodiversity and long-term changes in species distribution to finer-scale and shorter-term changes in community composition.

He did his PhD in Nancy (France) at AgroParisTech-ENGREF. He obtained his doctoral degree in forest vegetation sciences in 2009. After that, he spent 3 years as a post-doctoral fellow at Aarhus University (Denmark), where he studied plant macroecology and biogeography. He came back to France in 2011 and started a lecturer position in biostatistics at the Jules Verne University of Picardy (UPJV). In 2017, he got a full research position in ecology and biostatistics at the French National Centre for Scientific Research (CNRS).

Since his PhD, he has been particularly interested in biotic responses to climate change, such as species range shifts (upslope along elevational gradients and poleward along the latitudinal gradient) and community composition changes (community thermophilization), including lagging dynamics (climatic debt). His skills cover the fields of biogeography, biostatistics, ecoinformatics, forest sciences, macroecology, microclimate ecology, metacommunity dynamics, remote sensing, spatial statistics, species redistribution and plant ecology.

His current projects involve: (i) the study of the impact of forest microclimate dynamics in the biotic responses of understory plant communities to macroclimate warming; (ii) the development of fine-grained habitat suitability models based on remotely-sensed data; and (iii) the compilation of continental scale databases on biodiversity distribution (e.g. EVA, sPlot), species range shifts (e.g. Bioshifts) and soil or near-surface microclimates (e.g. SoilTemp).

PR. JAN BEBBINGTON

PROFESSOR, LANCASTER UNIVERSITY
PROFESSOR IN ACCOUNTING SPECIALISED IN ECOLOGICAL ACCOUNTING

Jan Bebbington is the Director of the Pentland Centre for Sustainability in Business at Lancaster University (UK) with a longstanding track record of research and publication on topics such as: the Sustainable Development Goals, motivations and rationales for non-financial reporting; carbon accounting; and sustainability assessment. Jan's most recent work focuses on the intersection between corporate and capital market activities and nature/biodiversity concerns. As part of that she is involved in a long-term collaboration between ecologists and sustainability scientists (at the Stockholm Resilience Centre and The Centre of Ocean Solutions at Stanford University) that provides knowledge to a practice-based cohort of seafood companies who are seeking to actively contribute to ocean stewardship (focusing on SDG 14 – Life Below the Water).

DR. PHILIPPE GRANDCOLAS

CNRS RESEARCH DIRECTOR,
MUSÉUM NATIONAL D'HISTOIRE NATURELLE
SCIENTIFIC DEPUTY DIRECTOR OF "CNRS ECOLOGIE ET ENVIRONNEMENT", IPBES OBSERVER
ECOLOGIST SPECIALISED IN THE EVOLUTIONARY BIOLOGY OF BIODIVERSITY

Philippe Grandcolas is an ecologist and evolutionary biologist, Research Director at the CNRS; he is currently Scientific Deputy Director of "CNRS Ecologie et Environnement", in charge of scientific foresight, mediation and relations with international platforms for the French community of around 100 laboratories.

He has recently published several books on biodiversity, including "Tout comprendre (ou presque) sur la biodiversité" (with Claire Marc, CNRS Editions, 2023) and "Fake or Not - Biodiversité" (Tana Editions, 2024).

CHAIRMEN BIOGRAPHIES

HÉLÈNE LACROIX

DIRECTOR OF THE INTERNATIONAL INSTITUTE FOR BIOECONOMY AND ENVIRONMENT
UNIVERSITY OF REIMS CHAMPAGNE-ARDENNE

Holder of a PhD in Plant Biology from Imperial College London, Hélène Lacroix has worked in the private sector at Syngenta (United Kingdom) and ARD (France) in the field of Plant Biotechnology. From 2009 onwards, she moved into research support functions as a project manager at Inserm's headquarters in Paris. From 2012 to 2021, she was responsible for the administrative and financial management of the CNRS Research Federation in Bioeconomy, the SFR Condorcet, led by the University of Reims Champagne-Ardenne and bringing together 700 researchers from the Grand Est, Hauts-de-France and Wallonia in Belgium. Starting in 2021, she was appointed Development Director of the Agrosciences, Environment, Biotechnology and Bioeconomy Division at the University of Reims Champagne-Ardenne. Since 2024, she is Director of the International Institute for Bioeconomy and Environment – EXEBIO, whose objective is to implement an ambitious strategy across the research–education–innovation–international continuum.

JULIEN VASTENAEKELS

JUNIOR CHAIR PROFESSOR
"ECONOMICS OF ECOLOGICAL TRANSITION AND BIOECONOMY"
REIMS ECONOMICS AND MANAGEMENT LABORATORY EA 6292 CRIEG
UNIVERSITY OF REIMS CHAMPAGNE-ARDENNE

Julien Vastenaekels holds the Junior Professor Chair in Economics of Ecological Transition and the Bioeconomy at the University of Reims Champagne-Ardenne (URCA). His research examines how political-economic dynamics shape socio-ecological transformations and the pursuit of just and regenerative futures. He focuses on the bioeconomy as a field where power relations and future visions interact, studying how anticipatory practices can capture or open pathways for socio-ecological bifurcations. His work seeks to understand how spaces of control can also become openings for collective change.

JEAN-LUC PETITJEAN

DOCTOR IN MANAGEMENT SCIENCES
AND HOLDER OF THE AGRÉGATION IN ECONOMICS,
ASSOCIATE PROFESSOR IN MANAGEMENT SCIENCES
REIMS ECONOMICS AND MANAGEMENT LABORATORY EA 6292 CRIEG
UNIVERSITY OF REIMS CHAMPAGNE-ARDENNE

Jean-Luc Petitjean is the Director of the Institute of Finance, Auditing and Accounting at the University of Champagne-Ardenne, France, and Head of the Master's programme in Management Control and Organizational Auditing at the Faculty of Economic, Social and Management Sciences.

Author of numerous publications in scientific journals, book chapters and conference papers, his research focuses on management control in contexts characterised by complexity (inter-organizational structures, universities, environmental control and CSR), as well as on environmental accounting.

EMMANUEL GUILLON

PRESIDENT OF THE INTERNATIONAL INSTITUTE FOR BIOECONOMY AND ENVIRONMENT
PROFESSOR OF ENVIRONMENTAL CHEMISTRY,
UNIVERSITÉ DE REIMS CHAMPAGNE-ARDENNE

Emmanuel Guillon is Professor of environmental chemistry at the University of Reims Champagne-Ardenne within the Institute of Molecular Chemistry of Reims (ICMR, CNRS UMR 7312). He develops research activities aimed at understanding the fate of contaminants (metals, pesticides, pharmaceuticals, microplastics, etc.) in the environment (water, soils) using a multi-scale approach from the molecular to the macroscopic level. The influence of organic residual amendments and cocktail effects are given particular consideration. Starting in 2016, he became Scientific Project Advisor for the field of Science and Technology within the Research Analysis Unit of the Research Evaluation Department at Hcéres. From 2017 to 2020, he co-developed the CNRS research infrastructure, 'Zone Atelier Environnementale Rurale Argonne' (ZARG) and directed it from 2021 to 2025. Since 2023, he has held the MERGE Industrial Chair, dedicated to methanation through a holistic approach. His work has resulted in around 120 publications, books, and patents. Since June 2024, he is President of the International Institute for Bioeconomy and Environment (EXEBIO), with the core objective is to implement the institute's strategic orientations.

CAROLINE RÉMOND

PROFESSOR OF BIOTECHNOLOGIES, UNIVERSITÉ DE REIMS CHAMPAGNE ARDENNE

Graduated in Enzymology and Microbiology from Compiegne Technological University (France), C. Rémond performed her PhD thesis in INRAE onto the enzymatic hydrolysis of wheat straw. After a 2-year post-doctorate in URCA-Reims Champagne-Ardenne University, she obtained a position as assistant professor in this University in 2000 and is full Professor of biotechnologies since 2010. She is Deputy Director of FARE-Fractionation of Agro-Ressources and Environment laboratory in Reims. She is also Director of the Chair AFERE-Agroressources FERmentation Enzymes which focus on the development of biotechnological processes to produce molecules of interest (fermentescible sugars, phenolic molecules, biosurfactants, biologically active molecules) from lignocellulosic biomass. C. Rémond is Deputy head of the ABIES doctoral school (Agriculture, food, biology, environment, health) and she is responsible of the EXEBIO graduate school. She is also responsible of the erasmus mundus joined master degree Bioceb (European master in biological and chemical engineering for a sustainable bioeconomy) for URCA.

POSTERS ABSTRACTS

Poster 1 - Jérémy Beucher, UR 3795 GEGENA, URCA
Investigation of sedimentary filling in the Germont-Buzancy marsh: impact on local hydrogeology and hydrology

Poster 2 - Amel Chammam, URD Agro-Biotechnologies Industrielles (ABI), CEBB, AgroParisTech
Eco-Friendly Extraction and Structural Characterization of Pectin from Citrus Peels

Poster 3 - Gayathri Chirayath Sudheer, UMR-I 02 SEBIO, URCA
Studying the effects of Fluoxetine on Zebra Mussels: An Individual and Molecular Approach

Poster 4 - Bastien Gitton, UMR CNRS 7312 ICMR, URCA
From small bio-based molecule to highly functionalised enantioenriched scaffolds.

Poster 5 - Corentin Griffon, USC INRAE 1488 RIBP, URCA
In vitro assessment of the antifungal activity of purified Sakuranetin against Botrytis cinerea: a step toward natural alternatives to synthetic fungicides

Poster 6 - Francisco Abel Guerrero-Páez, Department of Botany, Ecology and Plant Physiology & Department of Agronomy, University of Córdoba, Spain
Monitoring the dispersal of Spilocaea oleagina conidia in different olive orchards of Córdoba (Spain)

Poster 7 - Mohamed Taki Eddine Hamed, USC INRAE 1488 RIBP, URCA & Laboratory of Ecosystem Diversity and the Dynamics of Agricultural Production Systems in Arid Zones, University of Biskra, Algeria
Optimization of Irrigation Management in Arid Regions through Assimilation of Sentinel-2 Satellite Data and PSO Algorithm: Application to the AquaCrop Model

Poster 8 - Gaël Heysen, UR 3689 MATIM, URCA
Zinc oxide thin films obtained by soft chemistry methods for water purification

Poster 9 - Fatima Kaabouch, UMR CNRS 7312 ICMR, URCA
Development of Recovery Processes for Gadolinium Present in Hospital Effluents Using Modified and/or Eco-Designed Natural Biosorbents

Poster 10 - Pauline Leleux, UMR INRAE A 614 FARE, URCA & Génomique Métabolique, Genoscope, Université Paris-Saclay
Strategies to produce microbial pigments from lignocellulosic biomass.

Poster 11 - Coraline Leroux, UR 7548 ITheMM, URCA
Development of bio-based composites for bio-inspired structures

Poster 12 - Clément Nève, UMR CNRS 7312 ICMR, URCA & Department of Pharmacy, National and Kapodistrian University of Athens, Greece
Green Extraction and Bioactivity Profiling of Industrial Hemp Dust Pellets: A Sustainable Valorization Approach

Poster 13 - Glenn-Horland Pango, UR 3795 GEGENA, URCA
QualiSoC - Investigation of the impact of agroecological practices and layouts on the biological quality of soils in the chalky Champagne region

Poster 14 - Ajmal Peruvankuzhi Musthafa, UR 7510 ESCAPE, URCA
Plant-Derived Terpenes as Lead Compounds Against Toxoplasma gondii

Poster 15 - Quentin Pompidou, UMR CNRS 7076 L2N, URCA
Sustainable bio-sourced gate insulator for Organic Thin-Film Transistors

Poster 16 - Léonie Poncelet, USC INRAE 1488 RIBP, URCA
Metabolomics-driven investigations of bacterial communities-root interaction for grapevine resistance to downy mildew

Poster 17 - Kanto Rasoloarijaona, UR 7548 ITheMM, URCA
Exploring thermophysical behavior of an insulating wall plant fiber-based: Experimental and numerical study

Poster 18 - Alain Roux, UMR INRAE A 614 FARE, URCA & EA 6292 CRIEG-REGARDS, URCA
Blackboxing soil sequestration

Poster 19 - Idir Saber, USC INRAE 1488 RIBP, URCA
Apple Fruit as a Rapid Model to Assess Neofusicoccum parvum Virulence and Phytotoxin Production.

Poster 20 - Charles Wroblewski, School of Engineering, University of Guelph, Canada
Development of green synthesised inorganic nanomaterials and their application in sustainability of water and agriculture resources

Poster 1: Investigation of sedimentary filling in the Germont-Buzancy marsh: impact on local hydrogeology and hydrology

Jérémy Beucher, Olivier Lejeune, Alain Devos, Julien Berthe, Nicolas Bollot, Delphine Combaz, Théo Krauffel

Université de Reims Champagne-Ardenne, UR 3795 GEGENA, Reims, France

The Germont Buzancy fen, located at the head of the Bar watershed, represents the largest alkaline peatland in the Ardennes. Classified as a NATURA 2000 site and ZNIEFF type I area, it constitutes a key biodiversity hotspot, hosting emblematic taxa such as Castor fiber and Coenagrion mercuriale, as well as characteristic helophytic communities (Carex, Cladium). The system is nevertheless affected by recurrent summer edaphic dewatering in its central sector.

Sedimentological and hydrogeological investigations were undertaken to reconstruct the fen's long-term dynamics. Radiocarbon dating indicates the accumulation of a continuous 1.8 m peat sequence since the Late Glacial–Holocene transition, providing a valuable palaeoenvironmental archive. Beneath the peat, a 6–7 m thick succession of clayey-sandy silts, deposited as rhythmites, testifies to lacustrine sedimentation during the final Cataglacial stages. This unit hydraulically isolates the shallow peat aquifer from an underlying coarse calcareous alluvial aquifer resting on valley bedrock. ESR dating of the latter yielded an age of 450 ± 100 ka, correlated through geomorphological reconstruction with terrace formations associated with the hydrographic capture event of the Aire–Bar system.

The resulting sedimentary architecture defines a multilayer aquifer system. Groundwater recharge of the fen is complex: the deep confined aquifer is hydraulically disconnected from surface processes, whereas the peat layer is recharged by karstic springs, surface runoff, and overbank flows from the Bar River, and the Germont ditch. However, anthropogenic drainage and catchment reconfiguration since the 18th century, combined with global climate change, have modified the recharge regime. Due to its domed morphology, the central sector is predominantly ombrogenous, while marginal areas are sustained by lateral inputs, including runoff and karstic resurgence, reflecting topogenous and soligenous processes.

The recent recolonization of the site by several beaver (Castor fiber) populations induces localized and temporary rewetting. Dam-building activity raises upstream water levels, generating overbank flows that periodically flood the fen and adjacent plots. These hydrological alterations are sources of conflicts in land use with local stakeholders, particularly farmers and livestock breeders, who are affected by the resulting inundations.

Jérémy Beucher
University: University of Reims Champagne-Ardenne
PhD title: Hydro-geomorphological analysis for the restoration of the Germont-Buzancy peatland : Functionality study and methodological approach
Thesis year: 1st
Doctoral School (for URCA PhD students only): SHS

Poster 2: Eco-Friendly Extraction and Structural Characterization of Pectin from Citrus Peels

Amel Chammam, Amandine Flourat, Emilie Isidore, Morad Chadni

URD Agro-Biotechnologies Industrielles (ABI), CEBB, AgroParisTech, 51110 Pomacle, France

Citrus peels, a major by-product of juice production, are rich in bioactive compounds such as flavonoids, limonoids, essential oils, and pectin, which could be used in functional foods. Pectin, a plant-derived polysaccharide, has gelling, thickening, and stabilizing properties, making it valuable in food, pharmaceutical, chemical, and textile industries. In this study, pectin was extracted from citrus peels using eco-friendly methods (Fig. 1), including pressurized water without acid or alkaline addition, at different temperatures, times, and solid-to-liquid ratios. A comparative analysis of the extracted pectins was performed based on their structural characteristics (FT-IR spectra, molecular weight, monosaccharide composition) and antioxidant activity.

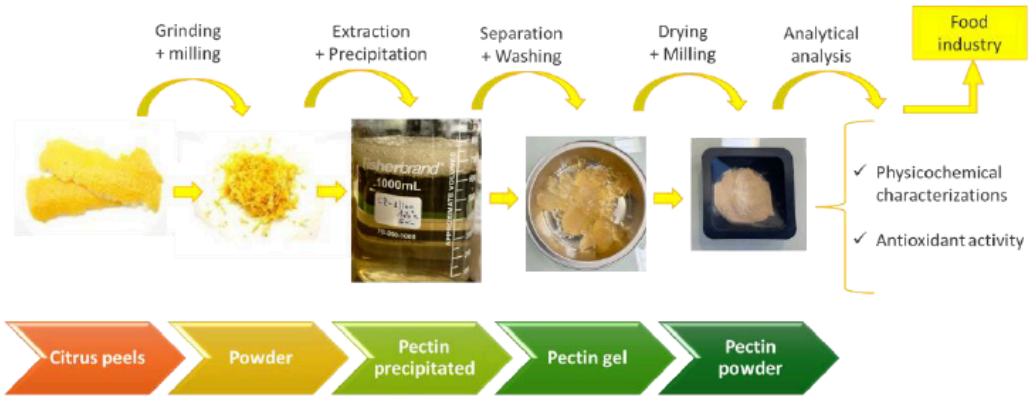


Fig. 1. Schematic overview of citrus peel valorization and pectin production

The pectin yield from citrus peels was influenced by extraction temperature (120, 140 and 160 °C), solid-to-liquid ratio (1:100 1:50 and 1:30), and extraction time (15 and 30 min). The maximum yield of 16% was obtained at 120 °C for 30 min with a 1 (g):100 (mL) ratio. Galacturonic acid content remained high (65–75%) across all conditions, indicating that the main pectin structure was well preserved. All samples had a degree of methyl-esterification above 50%, classifying them as high-methoxyl pectins, which are capable of forming gels under acidic conditions. Molecular weight ranged from 200 to 550 kDa, increasing with lower solid-to-liquid ratios and decreasing with higher temperatures and longer extraction times. Structural characterization by FT-IR and evaluation of antioxidant activity are currently in progress. These results demonstrate that eco-friendly extraction parameters can be optimized to obtain pectins with high yield and desirable structural and functional properties. These insights pave the way for sustainable utilization of citrus residues in food, pharmaceutical, and material industries.

Amel Chammam
University: INSA Toulouse
PhD title: Valorization of pinecone from Pineae genus: Intensification of extraction processes and identification of bioactive compounds
Thesis year: 3rd

Poster 3: Studying the effects of Fluoxetine on Zebra Mussels: An Individual and Molecular Approach

Gayathri Chirayath Sudheer[1], Nicolas Berthelot[1], Alain Geffard[1], Davide Degli-Esposti[2], Melissa Palos-Ladeiro[1]

[1] *Université de Reims Champagne-Ardenne, Université Le Havre Normandie, INERIS, Normandie Univ, UMR-I 02 SEBIO, Reims, France*
[2] *Institut national de recherche pour l'agriculture, l'alimentation et l'environnement, UR RiverLy, 69625 Villeurbanne*

Anthropogenic pollution, driven by the continuous release of chemical contaminants, has rendered even short-lived compounds pseudo-persistent in aquatic environments, degrading water quality and threatening aquatic biodiversity. Among them, Contaminants of emerging concern (CECs), including pharmaceuticals such as the selective serotonin reuptake inhibitor (SSRI) like fluoxetine (FLX), have been increasingly detected in the $ng \cdot L^{-1}$ aquatic systems. Bivalves, particularly Dreissena polymorpha, a widespread sedentary mussel with filter-feeding behaviour, are highly exposed to these waterborne pollutants and are ideal sentinel species for freshwater ecotoxicological studies.

In this study, we compare individual-level behavioural responses and molecular-level proteomic responses of mussels exposed to environmentally relevant concentrations of FLX (0.06, 0.6, 6 and 60 µg/L) to understand its toxicity. Individual-level behaviour was studied non-invasively via a videographic valvometric method, while molecular alterations will be assessed using a newly developed, highly multiplexed MRM method that will quantify targeted peptides from hemolymph, gills, and digestive glands. FLX exposure resulted in increased valve-open duration with increasing concentration, indicating an altered physiological response. Proteomic studies will explore the molecular pathways modulated by FLX.

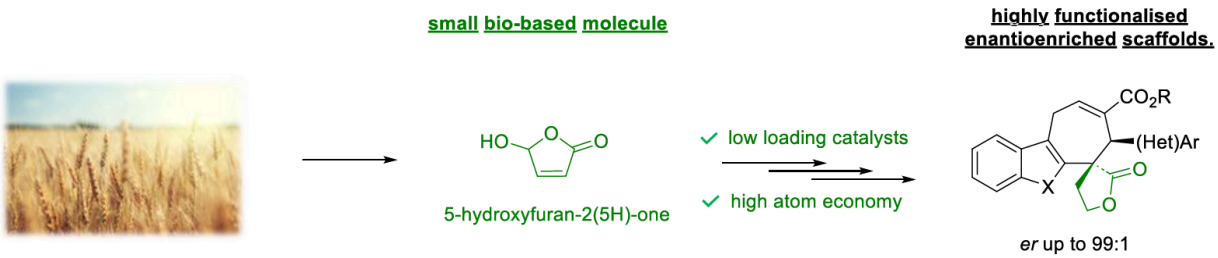
Chirayath Sudheer Gayathri
University: University of Reims Champagne-Ardenne
PhD title: ValvoSurv: Proteomic study exploring behavioural changes in Dreissena polymorpha under contaminant exposure
Thesis year: 2nd
Doctoral School (for URCA PhD students only): ABIES

Poster 4: From small bio-based molecule to highly functionalised enantioenriched scaffolds

Bastien Gitton[1], Rémi Pereira[1], Aurélien Blanc[2], Fabienne Grellepois[1], Emmanuel Riguet[1]

[1] *UMR CNRS 7312 ICMR, Université de Reims Champagne Ardenne, UFR Sciences Exactes et Naturelles, BP 1039, 51687 Reims Cedex 2, France*
[2] *UMR CNRS 7177, Institut de Chimie de Strasbourg, Université de Strasbourg, 4 rue Blaise Pascal, CS90032, 67081 Strasbourg, France*

Enantiomerically pure substances play a key role in many fields of research and applications ranging from pharmacochemistry to perfumery. The development of new synthesis methodologies allowing access to optically pure products is therefore an important challenge in modern organic chemistry. The effectiveness of the processes developed in this field must be evaluated by analysing the ecological impact of the various processes involved. In this respect, the use of molecules from renewable resources as well as the use of catalytic methods to carry out their transformations is a promising strategy.
5-Hydroxyfuran-2(5H)-one is a small polyfunctional molecule available in large quantities from non-food agricultural by-products. Our recent results, combining sigmatropic reaarangement and organocatalysis applied to substrates derived from hydroxyfuranone will be presented in this communication focusing on the versatility of this approach to reach various original highly functionalised scaffolds.



Bastien Gitton
University: University of Reims Champagne-Ardenne
PhD title: Studies of reaction sequences "Asymmetric Allylic Alkylation – Sigmatropic Rearrangement" for the structural diversification of aromatic rings.
Thesis year: 3rd
Doctoral School (for URCA PhD students only): BCS

Poster 5: In vitro assessment of the antifungal activity of purified Sakuranetin against Botrytis cinerea : a step toward natural alternatives to synthetic fungicides

Corentin Griffon[1], Christian Magro[2], Charles Monteux[2], Abdouramane Dosso[4], Bilal Loumi[4], Brice Dautruche[1], David Lesure[3], Emilie Isidore[4], Morad Chadni[4], Florence Fontaine[1]

[1]*University of Reims Champagne-Ardenne, Résistance Induite et Bioprotection des Plantes Research Unit, UR 4707, INRAE USC 1488, SFR Condorcet FR CNRS 3417, Reims, France*
[2]*Chestnut, 26 Rue Barthélémy de Laffemas, 26000, Valence, France*
[3]*Université de Picardie Jules Verne, Laboratoire de Glycochimie et des Agroressources, 33 rue Saint Leu - UFR des Sciences - 80000 Amiens, France*
[4]*URD Agro-Biotechnologies Industrielles (ABI), CEBB, AgroParisTech, 51110, Pomacle, France*

Botrytis cinerea is the fungal pathogen responsible for grey mold disease in grapevines, causing severe yield losses. This disease is currently managed mainly with synthetic chemical pesticides, which can be harmful to both human health and the environment. As a sustainable alternative, natural plant-derived compounds represent promising candidates, as they are generally less toxic and more biodegradable than conventional agrochemicals. Among them, secondary metabolites play a key role in plant defense mechanisms during biotic stress, including fungal infections. Flavonoids, a large and diverse class of secondary metabolites, have already been reported to participate directly in plant–pathogen interactions. Sakuranetin, an aglycone flavanone, is known to protect rice against blast disease; however, its activity against other phytopathogens has been little explored. The aim of this study was therefore to evaluate the antifungal potential of sakuranetin against B. cinerea through both in vitro and in vivo assays. Sakuranetin was purified from sour cherry twigs using flash chromatography followed by preparative HPLC, and its structure was identified and confirmed by UHPLC-ESIQTOF- MS/MS and nuclear magnetic resonance (NMR) spectroscopy. In vitro assays on Petri dishes showed that sakuranetin, at 75 mg/L, inhibited B. cinerea mycelial growth by 80%. Furthermore, complementary in vitro assays against Plasmopara viticola, the causal agent of downy mildew and another major grapevine disease, also gave promising results. These findings highlight the potential of sakuranetin as a natural antifungal for the sustainable control of grey mold and downy mildew in grapevine.

Corentin Griffon
University: University of Reims Champagne-Ardenne
PhD title: Bio-guided fractionation, purification, identification, and synthesis of valuable metabolites from arboricultural co-products as biopesticides for the control of Botrytis cinerea and Plasmopara viticola, two major grapevine pathogens
Thesis year: 3rd
Doctoral School (for URCA PhD students only): ABIES

Poster 6: Monitoring the dispersal of Spilocaea oleagina conidia in different olive orchards of Córdoba (Spain)

Francisco Abel Guerrero-Páez[1] [2], Mohand Amokrane-Bouchabane[1], Rafael Campos-Figueras[1], Zakaria Janfi[1], María Isabel Márquez-Pérez[1], María Ángeles Romero-Martín[1], Purificación Alcázar[2], Juan Moral[1]

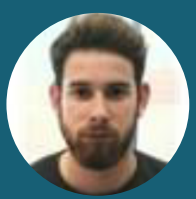
[1] *Department of Agronomy/ University of Córdoba-14071 Córdoba, Spain*
[2] *Department of Botany, Ecology and Plant Physiology/University of Córdoba-14071 Córdoba, Spain*

Olive Scab, caused by Spilocaea oleagina, is the most important aerial fungal disease affecting olive groves, widely distributed throughout Mediterranean regions. It is a hemibiotrophic fungus that colonizes exclusively living leaf tissue and reproduces asexually through conidia, the primary source of inoculum. These spores are mainly dispersed by the impact of raindrops on infected leaves. The disease causes severe defoliation, significantly reducing the tree's photosynthetic capacity and, consequently, olive production and oil quality.

To identity the spores picks of the Scab, we conducted an annual monitoring (May 2024–April 2025) using passive samplers installed in two types of olive grove systems in Cordoba province (Southern Spain): a super-high-density olive orchard of the Arbequina variety in Rabanales (5 × 2 m) and a traditional mountain olive grove of the Hojiblanca variety in San Cebrián (8 × 8 m).

In Rabanales orchard, sporulation was practically nil during the dry period (May–September) and increased with the first autumn rains (160 mm in October), with peaks recorded in autumn and spring. Conidia density showed positive correlations with accumulated precipitation and rainfall events > 2 mm, as well as with relative humidity. In addition, sporulation and total sporulation were positively associated with variables related to evapotranspiration and moderately associated with days of leaf wetness. In San Cebrián, sporulation began in January and peaked in February, coinciding with cool temperatures (~13 °C), high humidity (> 80 %) and frequent rainfall. In general, the correlations followed the same pattern as in Rabanales: conidia density increased with precipitation, humidity and intense rainfall events, while thermal variables showed negative correlations. On both fields, disease severity was strongly correlated with sporulation ($r > 0.90$; $p < 0.001$).

These results confirm that the dispersion and development of S. oleagina are closely linked to rainfall, humidity and the duration of leaf wetness, with marked differences between cropping systems and microclimates. Continuous monitoring of the inoculum using passive samplers provides valuable epidemiological information for predicting the risk of infection and optimizing the use of fungicides in more sustainable olive production.



Francisco Abel Guerrero-Páez
University: University of Córdoba, Spain
PhD title: Study of fungal aerial diseases of olive trees
Thesis year: 3rd

Poster 7: Optimization of Irrigation Management in Arid Regions through Assimilation of Sentinel-2 Satellite Data and PSO Algorithm: Application to the AquaCrop Model

Mohamed Taki Eddine Hamed[1,2], Guillaume Pierre[1], Julien Berthe[1], Hassina Hafida Boukhalfa[3]

[1]*Research group on Geomaterials and Anthropized Environments (GEGENA UR3795), University of Reims Champagne-Ardenne (URCA), France.*
[2] *Laboratory of Ecosystem Diversity and the Dynamics of Agricultural Production Systems in Arid Zones (DEDSPADZA), University of Biskra, Algeria.*
[3] *Laboratory Promotion of Innovation in Agriculture in Arid Regions (PIARA), University of Biskra, Algeria*

Irrigated agriculture in arid areas faces major challenges related to the management of limited water resources. In Algeria, optimizing irrigation management for cereal crops requires accurate estimation of water requirements in order to maintain yields while conserving water resources. This research develops an innovative approach combining particle swarm optimization (PSO) and Sentinel-2 satellite data assimilation to improve the performance of the AquaCrop model in estimating the water requirements of durum wheat (Triticum durum) in arid conditions. The study was conducted in the El Outaya plain (Algeria), on the Driss Amor farm, a cereal farm equipped with center pivot irrigation systems, and focused on durum wheat cultivation. Field data was collected over two consecutive agricultural seasons (2022-2023 and 2023-2024) and included irrigation and field management parameters, daily meteorological data and soil characteristics, as well as yield and water consumption measurements. The methodological approach combines Sentinel-2 data assimilation (updated every 5 days) with PSO optimization to automatically calibrate AquaCrop parameters. A comparison was made between the current irrigation practices adopted by farm managers and an irrigation strategy optimized by the model. The robustness of the approach was demonstrated by the K-Fold cross-validation method. The results demonstrate significant improvements over current practices, with average water saving of 165.75 mm per season, an average improvement in water efficiency (WP) from 1.1 to 1.22 Kg/m3, and a 13% increase in yield. The optimized approach improves agricultural productivity while conserving water resources. The validation over two agricultural seasons confirms the robustness and reproducibility of the method. The developed hybrid approach confirms the effectiveness of combining Sentinel-2 data assimilation with metaheuristic optimization applied to the AquaCrop model. This method significantly improves the accuracy of the AquaCrop model and provides an operational tool for precision agriculture. Thus, it contributes to food security and water resource conservation, with potential for wider application to optimize water management in cereal farming in arid regions.

Mohamed Taki Eddine HAMED
University: University of Reims Champagne-Ardenne, FRANCE/University of Biskra, ALGERIA
PhD title: Technical and economic feasibility study of precision irrigation of cereal crops in arid regions of Algeria
Thesis year: 4th
Doctoral School (for URCA PhD students only): ED SHS

Poster 8: Zinc oxide thin films obtained by soft chemistry methods for water purification

Gaël Heysen[1], Mickaël Gilliot[1], Aomar Hadjadj[1], Michaël Lejeune[2]

[1] *MATériaux et Ingénierie Mécanique (MATIM), Université de Reims Champagne-Ardenne, 51687 Reims, France.*
[2] *Laboratoire de Physique de la Matière Condensée (LPMC), Université de Picardie-Jules Verne, 80000 Amiens, France*

Water pollution caused by organic dyes from the textile industry is now a major environmental problem, not only because of their high persistence in aquatic environments, but also because of their toxicity to living organisms and their resistance to conventional treatment processes. These complex molecules are difficult to break down biologically and can accumulate, causing long-term adverse effects on human health and ecosystems. Faced with these challenges, the search for alternative, effective, sustainable, and economically viable solutions for wastewater treatment is a scientific and technological priority. To effectively eliminate these molecules, advanced oxidation techniques can be used, such as photocatalysis. Photocatalysis is a method that involves breaking down organic pollutant molecules through interaction with light on a material.

In this context, wide bandgap semiconductor materials such as zinc oxide (ZnO) are attracting growing interest due to their high photocatalytic activity, abundance, non-toxicity, and relatively low cost. ZnO is particularly notable for its ability to generate reactive oxidizing species under UV or solar irradiation, enabling the degradation of various organic pollutants.

Our work is part of this approach, with the aim of designing active ZnO films capable of effectively degrading organic pollutants in aqueous solution. To this end, two soft chemistry methods are being compared: the sol-gel method based on hydrolysis and condensation of metal precursors, and an approach inspired by the Pechini process leading to the formation of an organometallic gel.

In both cases, the layers are obtained by spin-coating the precursor solution, and calcination to obtain the crystalline phase of ZnO. The films are characterized by structural (XRD), morphological (SEM), and optical (ellipsometry) analyses. Photocatalytic performance is evaluated via the photodegradation of indigo carmine, used as a model dye, under controlled laboratory conditions. Particular attention is paid to the correlation between the properties of the films and their photocatalytic efficiency.

Laboratory tests have shown degradation rates of 96% with rate constants of 77.10-4 min-1, with the best materials achieving a lifespan of 36 hours for an initial pollutant concentration of 10 ppm.

This comparative analysis aims not only to better understand the respective advantages and limitations of the sol-gel and Pechini processes for the development of ZnO thin films, but also to provide guidance for choosing a suitable matrix for more complex systems. In particular, the results obtained could provide a solid basis for the preparation of nanocomposite films, which are expected to be more efficient again for photodegradation.

Gaël Heysen
University: University of Picardie Jules Verne
PhD title: ZnO-based nanocomposite thin films for water purification
Years of PhD: 3rd
Doctoral School (for URCA PhD students only): MPSNI

Poster 9: Development of Recovery Processes for Gadolinium Present in Hospital Effluents Using Modified and/or Eco-Designed Natural Biosorbents

Fatima Kaabouch, Juliette Moreau, Cyril Cadiou, Christelle Kowandy, Stéphanie Boudesocque, Laurent Dupont, Françoise Chuburu.

Université de Reims Champagne Ardenne - Institut de Chimie Moléculaire de Reims (UMR 7312) Reims, France.

Magnetic Resonance Imaging (MRI) has become an indispensable tool in medicine, especially with the growing prevalence of various diseases. To improve medical imaging quality, gadolinium-based contrast agents are widely used. Typically, a standard MRI examination involves the injection of about 1 g of gadolinium (0.1 mmol/Kg). while most of the administered agent is excreted through urine and discharged into hospital effluents, where they eventually reach aquatic environments. Annual releases are estimated at 3–4 kg of gadolinium per MRI scanner, highlighting the scale of anthropogenic input. Due to their high stability and hydrophilicity, these complexes persist in the environment as emerging micropollutants. Their resistance to conventional wastewater treatment processes has raised significant concerns regarding bioaccumulation and potential ecotoxicological effects for human health, aquatic ecosystems, and soil quality, which call for better monitoring and treatment.

To tackle this challenge, the objective of my thesis is to provide novel selective and eco-friendly biosorbents to capture metal cations from wastewater, combining advanced material science with environmental remediation strategies. The design of biosorbents currently under study is based on the modification of biosourced polymeric scaffolds by functional groups with a strong affinity for metal cations, Cu^{2+} as a model cation and ultimately Gd^{3+}. Chitosan (CS) from abundant, renewable biomass such as crab, shrimp and insect shells was chosen as the scaffold due to its ease of functionalization, and the safety, of both the substance its functionalized derivatives. In this poster, I will describe the synthesis and the characterization of CS functionalized with coordinating groups such as hydroxamates, catecholates, or polydentate chelators (e.g., EDTA, DTPA). Next, the sorption capacity of these materials for Cu^{2+} evaluated in batch experiments by varying parameters such as contact time, temperature, and pH, will be assessed.

Fatima Kaabouch
University: University of Reims Champagne-Ardenne
PhD title: Development of Recovery Processes for Gadolinium Present in Hospital Effluents Using Modified and/or Eco-Designed Natural Biosorbents
Thesis year: 2nd
Doctoral School (for URCA PhD students only): BCS

Poster 10: Strategies to produce microbial pigments from lignocellulosic biomass

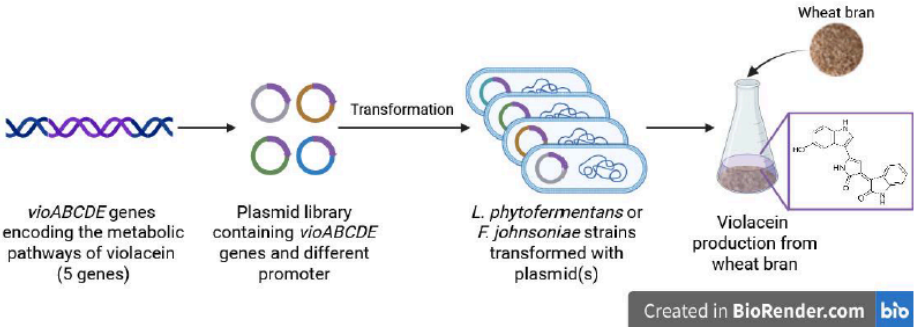
Pauline Leleux[1,2], Ludovic Besaury[1], Andrew C. Tolonen[2], Caroline Rémond[1]

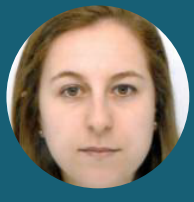
[1] *Université de Reims Champagne-Ardenne, INRAE, FARE, UMR A 614, AFERE, Reims, France*
[2] *Génomique Métabolique, Genoscope, Institut François Jacob, CEA, CNRS, University of Evry, Université Paris-Saclay, Evry, France*

Despite the long-standing use of natural pigments dating back to prehistoric times, synthetic pigments have now become predominant on the market. This transition is primarily attributable to two key factors: the reduction in production costs and the enhancement in stability exhibited by synthetic pigments. Nonetheless, the industrial production and utilization of these pigments have a considerable impact on the environment, in part due to their low biodegradability. In the textile industry, for instance, textile dyeing represents approximately one-third of the environmental impact of this industry. In this context, the use of natural pigments is gaining attractiveness as an environmentally friendly alternative. Among them, microbial pigments are of particular interest due to their rapid production, ease of extraction, and biological activities.

Although microbial pigment production has been of interest for several decades, using agro-industrial waste as a substrate for this process is a relatively recent approach. The aim of this project is to develop a sustainable microbial process using wheat bran, an abundant agro-industrial co-product for the production of various pigments such as violacein, prodigiosin, and flexirubin.

Here, we are developing two strategies for the microbial transformation of lignocellulose to pigments. First, metabolic engineering approaches are in progress to develop pigment-producing strains that can grow on lignocellulosic biomass and/or polysaccharides. To this end, a plasmid containing the violacein biosynthetic pathway was transformed into Lachnoclostridium phytofermentans and Flavobacterium johnsoniae, two lignocellulolytic strains. The second strategy involves both the use of a lignocellulolytic bacterium to pretreat lignocellulose and the use of a pigment-producing strain that will benefit from the pretreatment to synthesize its pigment. First the lignocellulolytic wild-type L. phytofermentans is cultivated on lignocellulose. In a second step, the natural pigment-producing strains, Chromobacterium vaccinii for violacein, Prodigiosinella aquatilis for prodigiosin, or Flavobacterium johnsoniae for flexirubin, are inoculated to produce pigments using the liberated fermentable sugars.
The poster will present the results obtained during the first year of this PhD project.





Pauline Leleux
University: University of Reims Champagne-Ardenne
PhD title: ColorBiomass: Microbial synthesis of pigments from lignocellulosic biomass
Thesis year: 2nd
Doctoral School (for URCA PhD students only): ABIES

Poster 11: Development of bio-based composites for bio-inspired structures

Coraline Leroux, Catherine Lacoste, Raphaël Moulart, Sébastien Alix

Université de Reims Champagne-Ardenne, ITheMM, 9A rue Claude Chrétien, 08000 Charleville-Mézières, France

Due to climate change, mentalities are changing, and environmental criteria are playing an increasingly important role in the choice of materials. Innovative solutions are emerging for product conception, such as the use of additive manufacturing or bio-based composites to use less materials and/or biodegradable and recyclable ones. This is the subject of this work with an additional section on biomimicry. Indeed, designing materials inspired by nature means being more creative and using materials only where necessary. This principle can therefore prove to be a valuable ally in achieving greater respect for the environment.

The aim of this study is to draw inspiration from plant biology, generate structural concepts and make them from bio-based composites using additive manufacturing technology before characterizing them (see Figure 1).

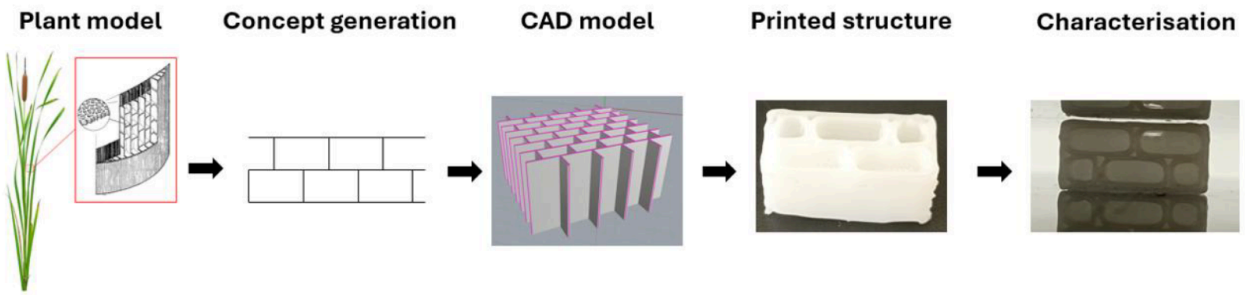


Figure 1: Process from ideas to characterization of bio-inspired structures from cattail leaf.

In this project, we drew inspiration from plants that grow in extreme conditions and have excellent resistance to bending and compression: cattail and cactus. More specifically, we take inspiration from the cellular organization of their leaves and stems, as their structures incorporate features designed to optimize the material distribution to withstand specific mechanical stresses (flexural, compression and impact tests).

These bio-inspired structures have all been printed from bio-based composites with a matrix composed of PolyButylene Succinate (PBS) and plant reinforcements ranging from 5 to 20 wt%. These reinforcements have been selected because they are derived from local agricultural by-products (hemp and flax shives) and 2 granulometric types are tested (powders ranging up to 50 µm and up to 100 µm) to see the impact on properties.

Bio-inspired structures (from cattail leaves and cactus stems) were successfully fabricated using 3D printing and are currently under mechanical characterization (flexural and impact tests). According to preliminary results, these structured materials have similar impact and flexural strengths to non-structured materials, while being approximately 35% lighter. They could therefore represent interesting solutions for areas such as sports equipment, automotive and construction.

Coraline Leroux
University: University of Reims Champagne-Ardenne
PhD title: Additive manufacturing and characterization of bio-inspired and bio-based composites
Thesis year: 3rd
Doctoral School (for URCA PhD students only): MPSNI

Poster 12: Green Extraction and Bioactivity Profiling of Industrial Hemp Dust Pellets: A Sustainable Valorization Approach

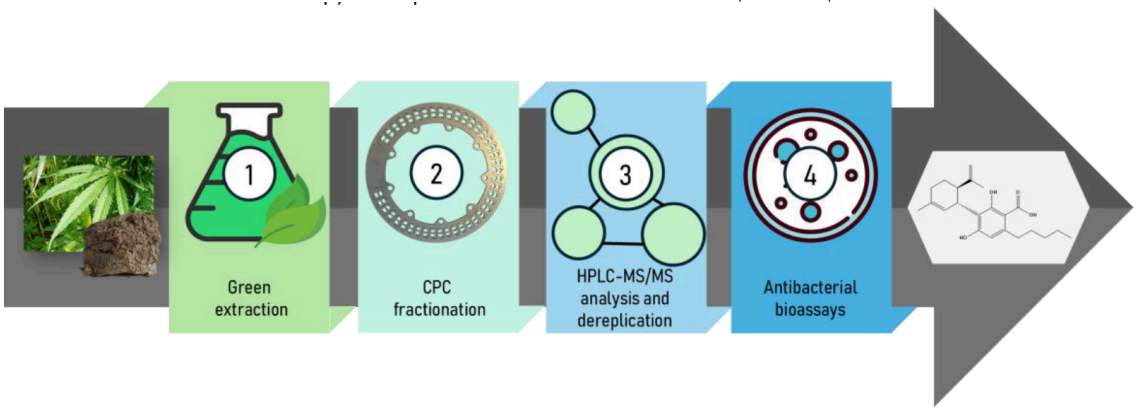
Clément Nève[1,2], Baptiste Marchesseau[1], Marius Colin[4], Anthony Abou Dib[1], Simon Remy[1], Jean-Hugues Renault[1], Alexios-Leandros Skaltsounis[2]

1 Université de Reims Champagne Ardenne, CNRS, ICMR UMR 7312, Reims, France
2 Division of Pharmacognosy and Natural Products Chemistry, Department of Pharmacy, National and Kapodistrian University of Athens, Panepistimioupoli Zografou, Athens, Greece
3 Université de Reims Champagne-Ardenne, UFR Pharmacie, Reims, Grand Est, France

Industrial hemp has become a cultivated crop of economic and ecological importance due to its qualities as an isolation material and as a textile fiber, replacing the polluting synthetic fibers and cotton. Hemp producers such as La Chanvrière (Aube) produce up to 100,000 tonnes of industrial hemp per year, which also results in the production of 11,000 tonnes of hemp dust collected in the factories and warehouses. Those large amounts of hemp dust are compacted into large pellets and then valorized into liquid fuel through bio/thermoconversion. However, these processes yield low quantities of fuel as the hemp dust contains high percentages of silica and dirt, resulting in a need for an alternative valorization for the dust pellets.

This study aims to valorize hemp dust pellets through the extraction of secondary metabolites of interest using green extraction techniques (maceration, ultrasound, and microwave-assisted extractions) with ethyl acetate and an ethanol/water mixture as extraction solvents. Extracts were analyzed by HPLC-MS/MS and compared; the fractionation of the most promising extracts was then performed using Centrifugal Partition Chromatography (CPC), a liquid-liquid preparative technique that avoids the use of expensive and non-recyclable chromatographic solid supports. CPC fractions were analyzed by HPLC-MS/MS in positive ionization mode and subsequently processed using a dereplication methodology that included the use of MZmine, SIRIUS, and Cytoscape open-source software. This workflow resulted in the obtention of molecular networks highlighting the presence of numerous secondary metabolites in the extracts, notably cannabinoids, lipids, terpenes, cinnamic acid derivatives, and flavonoids.

Fractions were then tested for their anti-microbial activities against a Pseudomonas aeruginosa strain (Gram-negative, CIP: 82,118) and a Staphylococcus aureus strain (Gram-positive, CIP: 53, 154). Two fractions obtained from the ethyl acetate extract showed a significant inhibitory effect against the Staphylococcus aureus strain. Further purification of these fractions, followed by NMR analysis of the pure compounds, culminated in the identification of cannabidiolic acid (CBDA), the most common cannabinoid in industrial hemp, as responsible for the inhibition.



Clément Nève
University: University of Reims Champagne-Ardenne
PhD title: Développement de systèmes biphasiques de solvants verts pour la chromatographie de partage centrifuge (Green-CPC)
Thesis year: 2nd
Doctoral School (for URCA PhD students only): ABIES

Poster 13: QualiSoC - Investigation of the impact of agroecological practices and layouts on the biological quality of soils in the chalky Champagne region

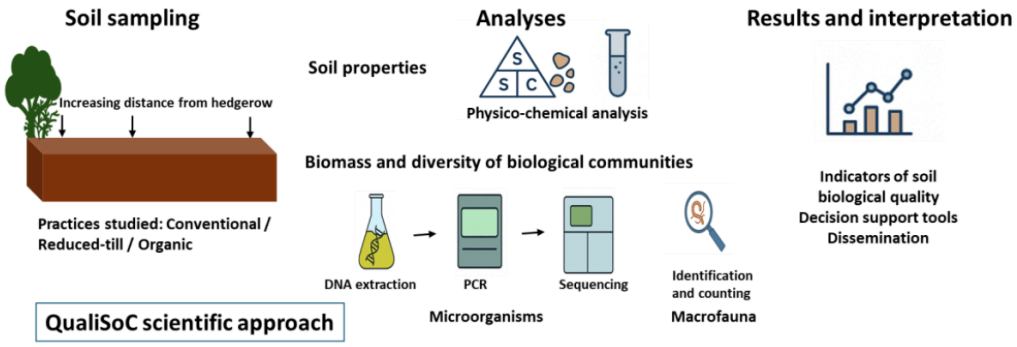
Glenn-Horland Pango[1], Maxime Gommeaux[1], Béatrice Marin[1], Bérénice Goin[2]

[1] *GEGENA, University of Reims Champagne-Ardenne (URCA) - 2 Esplanade Roland Garros 51100 Reims*
[2] *Symbiose « pour des paysages de biodiversité » - 2 Rue Léon Patoux 51100 Reims*

The preservation of soils is a major challenge in the context of global change and the growing degradation of natural resources. Soil biodiversity is essential for the health and resilience of agro-ecosystems: it regulates biogeochemical cycles, maintains functional biodiversity, improves fertility, prevents erosion and compaction, and contributes to the degradation of contaminants. Protecting this biodiversity is therefore key to ensuring the long-term sustainability of agricultural systems, in line with the principles of the bioeconomy, which combine the sustainable production of agri-resources with the preservation of the environment.

The QualiSoC project, led by the GEGENA research unit (University of Reims Champagne-Ardenne) and the association Symbiose, addresses this issue at the interface between ecology, agronomy, and land management. Its aim is to evaluate how agroecological practices and landscape elements, particularly hedgerows, influence soil biodiversity and biological functioning in the chalky Champagne region. In this region, soils are naturally poor in organic matter (0.5-2%) and highly sensitive to erosion. Productivity often depends on heavy inputs of organic matter and intensive tillage, practices that ultimately harm soil structure and biodiversity. Restoring soil quality through sustainable, environmentally friendly practices has become essential.

The study is carried out on a network of farms between the southern Ardennes, the Marne and the northern Aube départements, involving both Symbiose members and non-members. Different landscape configurations are compared (presence or absence of hedgerows), while also considering farming systems (conventional, reduced tillage, and organic). A multi-indicator approach is used, combining physicochemical properties, microbial biomass and diversity, and soil macrofauna such as earthworms.



The project ultimately seeks to provide farmers with knowledge and practical guidance to support the transition toward environmentally friendly agriculture that values natural ecosystems and enhances the resilience of production systems in the face of climate challenges. Different actions are undertaken to disseminate the results of the QualiSoC project to both the national and international scientific community but also to farmers and other rural stakeholders such as cooperatives and beneficiaries of the rural areas, private businesses, funders, local authorities and the general public.

Glenn-Horland Pango
University: University of Reims Champagne-Ardenne
PhD title: QualiSoC Investigation of the impact of agroecological practices and layouts on the biological quality of soils in the chalky Champagne region
Thesis year: 1st
Doctoral School (for URCA PhD students only): ABIES

Poster 14: Plant-Derived Terpenes as Lead Compounds Against Toxoplasma gondii

Ajmal Peruvankuzhi Musthafa[1], Maanasa Bhaskaran[1], Julien Cordonnier[2], Mondher Briki[2], Sandie Escotte-Binet[1], Isabelle Villena[1], Valentin Greigert[1]

[1] *University of Reims Champagne-Ardenne, ESCAPE, Reims, France*
[2] *University of Reims Champagne-Ardenne, CNRS, ICMR, Reims, France*

Toxoplasma gondii and Cryptosporidium spp. are major apicomplexan parasites that pose serious threats to human and animal health. T. gondii is transmitted through ingestion of oocysts present in contaminated water, fruits, vegetables, or undercooked meat, and it can infect nearly all warm-blooded animals, including those consumed by humans. Approximately 30% of the global population has been exposed to T. gondii, raising major public health concerns, particularly congenital toxoplasmosis, which can lead to severe developmental abnormalities. Cryptosporidium, which causes severe diarrhea in children in low-resource settings and in young ruminants, infects multiple host species, including livestock. Currently, no effective vaccine exists against cryptosporidiosis, and the only approved drug, nitazoxanide, has limited efficacy.

Terpenes are a diverse class of natural products abundant in plant extracts, many of which have promising antiparasitic activity. Previous work in our laboratory demonstrated that terpenes in bark tree extracts mediate anti-T. gondii effects. Building on these findings, we conducted a preliminary screen of a commercial terpene library containing 659 compounds. Using advanced computational algorithms, we selected 132 representative molecules for experimental testing. Compounds were screened against T. gondii using an automated real-time live-cell imaging system that quantifies fluorescence from a transgenic GFP-expressing parasite strain. Fifteen terpenes were identified with strong inhibitory activity (Figure 1). Half-maximal inhibitory concentrations (IC_{50}) were determined for these 15 compounds (Figure 2a), followed by cytotoxicity testing (CC_{50}) using the resazurin-based Uptiblue® assay. Selectivity indices were calculated from IC_{50} and CC_{50} values (Table 1).

Six terpenes—δ-amyrenone, betulonic acid, eriocalyxin B, cryptotanshinone, glaucocalyxin B, and zerumbone—were prioritized based on a selectivity index greater than 10. Three additional compounds (pristimerin, tipterin, and bardoxolone) displayed strong antiparasitic activity but also high cytotoxicity. Current efforts aim to optimize promising hits by exploring chemical analogs with enhanced efficacy and reduced toxicity. Ongoing and future work includes mechanistic studies consisting of parasite morphology, invasion, replication, and host cell lysis exploration, as well as target identification through in silico predictions validated experimentally. Expanded cytotoxicity testing is underway, and parallel screening will be extended to Cryptosporidium parvum and various T. gondii strains to broaden translational relevance.

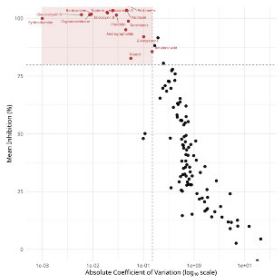


Fig 1

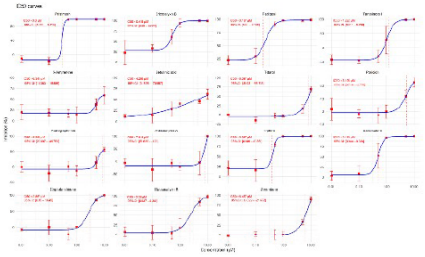


Fig 2

Compounds	CC50	IC50	SI
Pristimerin	2.232	0.3	7.44
Paclitaxel	NA	0.187	NA
Tanshinone I	9.21	1.222	7.536825
δ-Amyrenone	>100	6.341	>15.77
Betulonic acid	57.296	4.286	13.36818
Totarol	26.666	8.379	3.18248
Ponicidin	13.471	5.195	2.59307
Andrographolide	46.507	8.366	5.559049
Ardisiacrispin A	5.431	7.914	0.686252
Eriocalyxin B	6.302	0.419	15.04057
Tripterin	3.241	0.387	8.374677
Bardoxolone	4.534	0.489	9.271984
Cryptotanshinone	67.952	2.867	23.70143
Glaucocalyxin B	26.178	2.35	11.13957
Zerumbone	84.836	6.457	13.13861

Fig 3

Ajmal Peruvankuzhi Musthafa
University: University of Reims Champagne-Ardenne
PhD title: Integrated Approach for Drug Development Based on Natural Compounds Against Apicomplexa: From Bioprospecting to the Identification of New Therapeutic Target
Thesis year: 1st
Doctoral School (for URCA PhD students only): BCS

Poster 15: Sustainable bio-sourced gate insulator for Organic Thin-Film Transistors

Quentin Pompidou[1], Nicolas Bercu[1], Laurence Foulon[2], Florence Etienne[1], Sylvain Potiron[1], Louis Giraudet[1], Véronique Aguié-Béghin[2], Olivier Simonetti[1]

[1] *L2n@Reims / Université de Reims Champagne-Ardenne – Campus Moulin de la Housse, 51100 Reims,*
[2] *UMR FARE / INRAE, Université de Reims Champagne-Ardenne – CREA, 2 Esp. Roland Garros, 51100 Reims,*

Microchips are a strategic element for today's technological components in many sectors, particularly for Hi-tech industries (computers, smartphones, sensors, Internet of Things [IoT], ...). The technological rapid advancement for these industries led to a significant environmental impact, which was ignored for long. These ecological concerns come from three different aspects, with the first being the Greenhouse Gases (GHG), representing nearly 3.9 % of GHG emissions due to the extensive use of energy. In addition, the global spend water reached 220 kt (kilotons) which represents the average consumption of 29 million of U.S. citizens along with the 880 kt waste hazardous substances.

3 4

The idea of making electronics based on organic materials came in the late 80s. In this context, the Organic Electronic (OE) present a various domain of applications, such as flexible electronics, ultra-thin displays, biosensors, and so on. Among the electronic components, the transistors are a key element of these applications. However, a big challenge remains due to the difficulty to make efficient and stable organic electrical devices. Finally, these elements can also be included in green electronic using more eco-responsible fabrication processes, and using environment organic element (chitin, β-carotene, indigo, sugar molecules...), making the components biodegradable and possibly edible.

The GRIOT—EXEBIO project aims to replicate the typical Thin-Film Transistor (TFT), using bio-sourced materials (cellulose and derivatives, lignin, ...) studying particularly the gate insulator of this component (see figure). This project is a partnership between the L2n@Reims and FARE—INRAE laboratories. This work focuses on the insulator layer deposition process as a good homogeneity and low surface roughness is essential for great device's charge transport stability and efficiency.

In this communication, the fabrication methodology of a OTFT component will be given, along with its structural measurements (thicknesses, roughness, ...) and electrical characteristics (leakage current, current-tension...). The effectiveness of the device is discussed, and perspectives will be given.

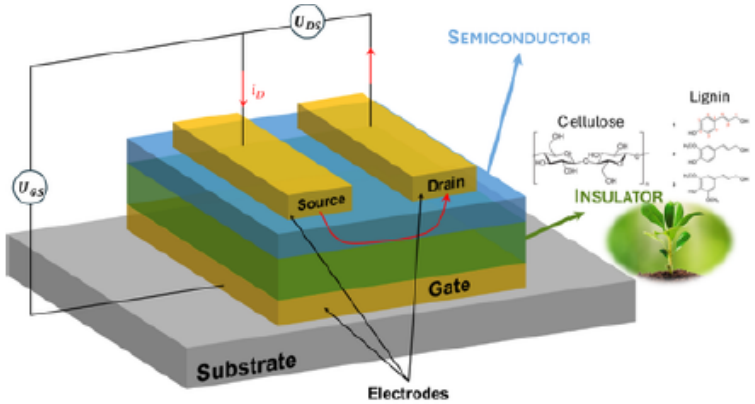


Figure: schematical representation of an Organic Thin-Film Transistor (OTFT).

Quentin Pompidou
University: University of Reims Champagne-Ardenne
PhD title: Electrical effects on thermal boundary conductances
Thesis year: 4th
Doctoral School (for URCA PhD students only): MPSNI

Poster 16: Metabolomics-driven investigations of bacterial communities-root interaction for grapevine resistance to downy mildew

Léonie Poncelet[1], Marisa Maia[2], Morgane Duret[1], Vincent Carré[3], Aziz Aziz[1]

[1] *Université de Reims Champagne-Ardenne, INRAE, RIBP, USC 1488, 51100 Reims, France*
[2] *Grapevine Pathogen Systems Lab, Universidade de Lisboa, 1749-016 Lisboa, Portugal*
[3] *Université de Lorraine, LCP-A2MC, F-57000 Metz, France*

The plant roots are the primary interface and a source of signals for plant-rhizospheric microbe interactions and for root-to-shot-communication. Such interactions may shape specific bacterial communities and modulate both root and systemic defence reactions. Some beneficial bacteria can trigger systemic immunity against a wide range of foliar diseases, thereby reducing plant susceptibility to pathogen attack. However, metabolic markers for the prediction of induced resistance and the role of root metabolic change in systemic immunity remain unknown. In this study, we performed whole root metabolic profiling in two grapevine varieties differing in their susceptibility to downy mildew, through Fourier Transform Ion Cyclotron Resonance Mass Spectrometry (FT-ICR/MS) approach, to better understand the relationship between metabolic signatures and systemic immunity against P. viticola. The bacterial communities used in this study were isolated from the rhizosphere of grapevine varieties and are mainly composed of Enterobacter, Pseudomonas and Serratia. FT-ICR/MS analyses showed distinct metabolic profiles between the roots of the resistant variety compared to the susceptible one after pathogen infection. Data also revealed metabolic discrimination with most bacterial communities in roots before and after leaf infection in susceptible cv. but not in the resistant cv. The roots of both grapevine varieties respond to bacterial communities with common and different metabolic clusters, which seem to be related to priming state of plants for enhanced resistance to P. viticola. These results provide new insights into the root-specific metabolic signatures including stilbenic phytoalexins to the genetic and induced systemic resistance against P. viticola.

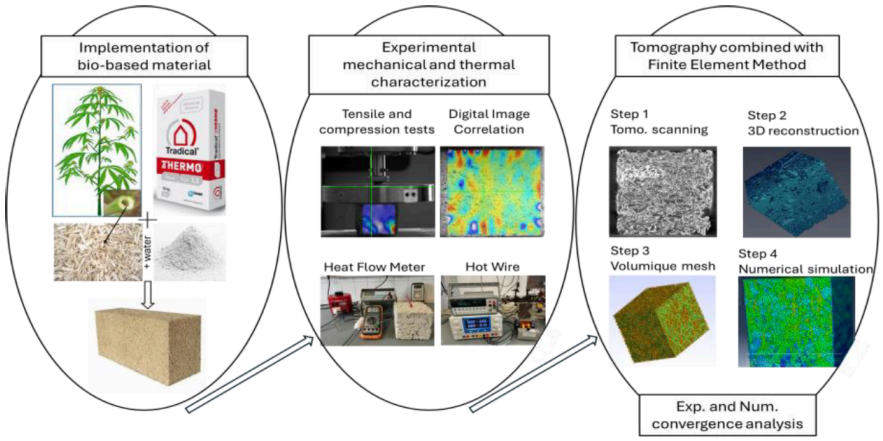
Léonie Poncelet
University: University of Reims Champagne-Ardenne
PhD title: Role of Root Metabolism in Systemic Immunity during grapevine-Beneficial Microbiota Interaction
Thesis year: 3rd
Doctoral School (for URCA PhD students only): ABIES

Poster 17: Exploring thermophysical behavior of an insulating wall plant fiber-based: Experimental and numerical study

Kanto Ny Rina Rasoloarijaona, Alexandre Gacoin, Samir Allaoui, Hervé Pron

ITheMM / Université de Reims Champagne-Ardenne – 2 Avenue Robert-Schuman, 51100 Reims, France

In the context of the energy and environmental transition, it is crucial not only to improve the energy efficiency of buildings but also to limit the carbon footprint of the materials employed. The use of biobased concretes gains a lot of interest in the research field as they offer long-term sustainability of buildings. However, most numerical models used to simulate the thermomechanical behavior of bio-based concretes remain simplified, relying on generic material properties – no distinction made between the three phases of a biobased concrete: binder, fibers and pores - and idealized geometries. The originality of this work is to present a more representative numerical model where binder, fibers, and pores are explicitly represented with realistic geometrical features. We aim to develop and enable efficient numerical process to run calculus on realistic model of biobased lime-hemp concrete – highlighting binder, fibers and pores in order to predict the behavior of plant fiber-based insulation walls under different conditions, taking into account the properties of each component. To achieve this, thermal and mechanical experiments are conducted on lime-hemp concretes formulated with Tradical Thermo® (lime) and Technichanvre C020® (hemp shiv), aiming to optimize their composition and implementation for enhanced building energy performance. The experimental data are integrated into the developed numerical model for validation and comparison. Thus, thermal conductivity was first evaluated using the hot wire and heat flow meter methods to highlight the insulating potential of our lime-hemp concrete (Binder/Fibers = 1.8 – Density approximately 500 kg.m-3). We show up relatively low thermal conductivity ($0.08 < \lambda < 0.17$ W.m-1.K-1), confirming the insulating properties of our biomaterials. Subsequently, a compression test coupled with digital image correlation (DIC) was conducted on our lime-hemp concrete sample to determine its stiffness and Poisson's ratio, and to analyze the deformation fields in order to target areas of potential failure and identify structural weaknesses in bio-based concrete. Experimental results indicate a Young's modulus ranging from $22.6 < E < 38.8$ MPa and a Poisson's ratio $0.18 < \nu < 0.22$ aligning with the values reported in the literature. Finally, the numerical modeling was performed using three-dimensional reconstruction of tomographic images, followed by finite element analysis and compression test simulations conducted with Abaqus software. We present a protocol that enables numerical simulation of thermal and mechanical tests such as compression and thermal conductivity in Abaqus™, using 3D reconstructed, binarized (binder and fibers) image sequences of our sample. The numerical simulation results are in agreement with experimental data, reinforcing the relevance of pursuing a three-phase modeling approach that accounts for binder, fibers, and pores.



Kanto Ny Rina RASOLOARIJAONA
Universities: University of Reims Champagne-Ardenne
PhD title: Experimental and numerical study of the thermophysical behavior of an insulating wall made of plant fibers
Thesis year: 2nd
Doctoral School (for URCA PhD students only): MPSNI

Poster 18: Blackboxing soil sequestration

Alain Roux[1, 2]

[1] *UMR INRAE A 614 FARE, Université de Reims Champagne-Ardenne, 2 esplanade Roland Garros, 51100 Reims, France*

[2] *UR 6292 CRIEG-REGARDS, Université de Reims Champagne-Ardenne, Bâtiment Recherche, BP 30, 57 rue Pierre Taittinger, 51571 Reims cedex, France*

The focus of our research is what is referred to as soil carbon storage or sequestration. This multiplicity of terms, and the absence of a stabilized definition, shapes our research question: we investigate how actors appropriate and mobilize this unsettled concept. Recently, the promise of managing soil carbon stocks for mitigation purposes, extending forest management to agricultural land has been promoted by a community of soil scientists and the French Ministry of Agriculture, who launched the "4 per 1000" initiative in 2015 during COP 21. This ratio means that an annual increase of 0.4% in soil carbon stocks could fully offset annual anthropogenic emissions. This statement has been variously interpreted as a target, a message, or a slogan. Yet, according to participating scientists, "since its launch

it has given rise to a scientific controversy, sometimes quite heated" (Inrae, 2019). Among other issues, soil presents a dual nature: it can both emit and store carbon. Carbon storage is therefore reversible: carbon would be re-emitted into the atmosphere as CO_2 if agriculture were to abandon agroecological practices, or in the event of unexpected occurrences such as a natural disaster or the effects of climate change. This biophysical controversy is intertwined with a political controversy over the principle of compensation, and an economic controversy over the sale of carbon credits.

Our thesis examine the tension between this knot of controversies and the institutionalization of soil carbon, combining the approach of science and technology studies with that of ecological economics in its institutionalist tradition. We study how a controversial idea nevertheless becomes embedded in economic devices such as carbon credits, themselves inscribed in carbon neutrality objectives promoted by public policies and corporate self-regulation. From science and technology studies, we borrow the notion of "blackboxing" (Latour). This concept is based on the idea of a "black box" used by cyberneticists when a machine or a set of commands is too complex: instead, they draw a small box whose only known elements are inputs and outputs. When a fact is established, or when a machine works efficiently, there is no need to focus on its internal complexity, only on inputs and outputs. The analysis of blackboxing then consists in studying how doubts and nuances — inherent to scientific work — are rendered invisible.

In ecological economics, meanwhile, we pay attention to the way neoclassical and Coasian-inspired economic science frames the problem of climate change and its responses. More precisely, it is the axiom of least cost that drives economists to seek compensation solutions (reducing CO_2 where abatement costs are lowest) and market solutions (carbon credits). In our case study — the design of a carbon credit methodology in France between 2019 and 2024 — we show how the sale of a carbon credit requires the invisibilization of doubts raised by storage and sequestration; otherwise, it represents a risk for the investor who buys a credit to offset his carbon balance in extra-financial reporting.

The poster we propose, draws on the image of blackboxing to present the main results of the dissertation, structured in two parts. The first part retraces the history of the idea of sequestration — its emergence, dissemination, legitimization, and eventual use in climate policies. This analysis relies on documentary sources, in particular expert reports addressed to decision-makers, beginning with the rise of carbon cycle models in the 1960s. It is primarily an American story, in which economist William Nordhaus, later awarded the Nobel Prize, plays a notable role. The second part examines the consequences of this history: sequestration caught in a tension between institutionalization and contestation. The case study of the design of carbon credits relies in particular on 20 semi-structured interviews with the actors involved in the methodology (agricultural chamber officers, members of an agronomic innovation cluster, cooperatives, soil scientists, etc.).

Alain Roux
University: University of Reims Champagne-Ardenne
PhD title: Blackboxing soil sequestration
Thesis year: 4th
Doctoral School (for URCA PhD students only): ABIES

Poster 19: Apple Fruit as a Rapid Model to Assess Neofusicoccum parvum Virulence and Phytotoxin Production

Idir Saber[1] & Larissa Zeltner-Heck[1,2], Simon Remy[3], Jean-Hugues Renault[3], Jochen Fischer-Schuch[2], Eckhardt Thines[2], Florence Fontaine[1], Patricia Trotel-Aziz[1]

[1]*Université de Reims Champagne-Ardenne, INRAE, Research Unit Résistance Induite et Bioprotection des Plantes, RIBP USC 1488, 51100 Reims, France*
[2]*Institute for Biotechnology and Drug Research, Johannes Gutenberg-University, Hanns-Dieter-Huesch-Weg 17, 55128 Mainz, Germany*
[3]*Université de Reims Champagne Ardenne, Institut de Chimie Moléculaire de Reims UMR CNRS 7312, 51100 Reims, France*

Neofusicoccum parvum can infect a wide variety of plants, including several major fruit crops such as peach, apple, and grapevine, as well as their harvested fruits. These infections generate substantial economic losses at national, European, and global scales. In the current context of environmental changes that do not always favor plants and beneficial organisms, it is crucial to better understand the factors driving the aggressiveness of this pathogen. Previous studies have already shown that N. parvum isolates that differ in their pathogenicity also differ in their ability to produce phytotoxins.

In our work, we developed an infection model using apple (Malus domestica) to rapidly evaluate N. parvum virulence together with associated metabolic responses, combining both targeted and untargeted metabolomic approaches. Within less than two weeks, infections resulted in strong browning and tissue decay, with clear differences depending on the fungal strain. Severe necrotic symptoms were correlated with high levels of the polyketide (-)-terremutin. Untargeted metabolomic profiling of infected apples revealed distinct molecular signatures depending on the strain, with numerous polyketides enriched in response to the highly aggressive isolate. Targeted analyses confirmed that (-)-terremutin accumulated in apples as early as 3 days post-inoculation, reaching a maximum at 9 days, while being less abundant with other strains. Moreover, discriminant analysis of the metabolome identified both shared and strain-specific metabolites among the top 30 features with the highest Variable Importance in Projection (VIP) scores.

Overall, this study demonstrates that apple fruit represents a useful “simplified model” to quickly assess N. parvum virulence and its phytotoxin

Idir Saber
University: University of Reims Champagne-Ardenne
PhD title: Characterization of Moderators of the accumulation of two phytotoxins produced by Neofusicoccum parvum , the agent of Botryosphaeria dieback ingrapevines.
Thesis year: 2nd
Doctoral School (for URCA PhD students only): ABIES

Poster 20: Development of green synthesised inorganic nanomaterials and their application in sustainability of water and agriculture resources

Charles Wroblewski, Sivaranjani Palanisamy Ravikumar, Rahul Islam Barbhuiya, Abdallah Elsayed, Ashutosh Singh

School of Engineering, University of Guelph, Guelph, 50 Stone Road East, N1G2W1, ON, Canada

The accelerating challenges of climate change, environmental degradation and unsustainable agricultural practices demand innovative technologies that can restore ecosystem health while maintaining food security. Amone these, nanomaterials emerge as a transformative solution for protecting soil and water systems; two of the planets' most critical resources. These environments are intricately linked; contamination leaving from soil pollutes water ways while polluter water used for irrigation further undermines soil quality. Together, they regulate nutrient cycling, sustain biodiversity and directly influence human well-being, making remediation essential for planetary health.

Persistent organic pollutants (POPs) such as pharmaceuticals present a major threat to aquatic environments due to their stability and resistance to natural degradation as a result these compounds accumulate in ecosystems. In parallel, agricultural practices relying on chemical fertilizers create nutrient imbalances, with only a small fraction of applied compounds being absorbed by crops. The remainder is washed into waterways where even trace concentration can trigger eutrophication, algal blooms and oxygen depletion that devastated aquatic life. Soil health is further undermined by the progressive loss of soil organic matter (SOM), a vital reservoir for nutrients, water retention and microbial activity. Climate change, intensive farming and improper management accelerate these losses, threatening lobal food production and long-term sustainability.

Conventional remediation approaches such as activated carbon, zeolite and ion exchange resins have been reported for contaminant capture or nutrient retention. However, these materials often exhibit low capacity, weak selectivity and limited regeneration potential, restricting their large-scale application. This highlights the urgent need for new technologies that are both effective and cost-effective. Nanomaterials defined by their nanoscale size (1-100 nm) and unique surface-to-volume rations offer precisely this opportunity. Their tunable surface chemistry, high reactivity, and functional versatility enable them to capture contaminants, improve nutrient use efficiency and restore degraded soils in ways unattainable with bulk materials.

Proof of concept studies developed a model and demonstrated the feasibility of synthesizing nanoparticles using sustainable feedstocks such as agri-food waste extracts which align with circular economy principles and offer environmentally friendly alternatives to conventional chemical synthesis. Building on this foundation magnetically separable iron oxide nanoparticles (IONPs) were applied for the removal of tetracycline, a widely used antibiotic and POP. These nanoparticles exhibit high adsorption capacity, removing 70-90% of the antibiotic across a range of concentrations and temperatures following pseudo second order kinetics. These particles were reused with efficiency ranging from 91-80% after four sorption-desorption cycles. Additionally, IONPs were applied for the removal of nutrients (phosphate and nitrate) in aqueous systems demonstrating a pH dependent sorption. Subsequent applications were studied in soils for the enhanced retation of these nutrients improving efficiency of fertilizer and reducing eutrophication risks. Additionally, the use of nanomaterials is suggested to assist in restoring SOM through the binding of organic materials such as Humic acid. Together these applications illustrate the potential of nanotechnology as a transformative approach for safeguarding ecosystems and ensuing sustainability.

Charles Wroblewski
University: University of Guelph
PhD title: Development of green synthesised inorganic nanomaterals and their application in sustainablility of water and agriculture resources
Thesis year: 4th

SOCIAL EVENTS

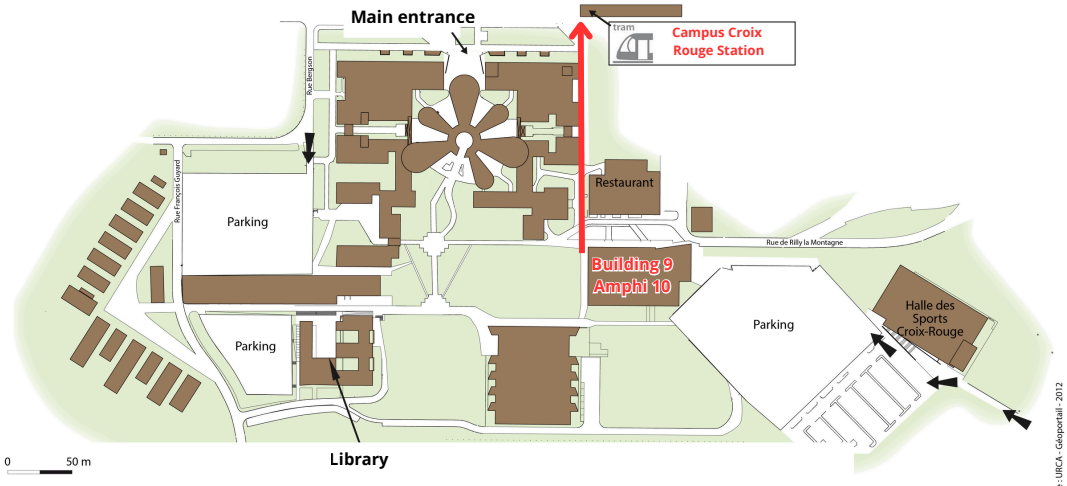
Social events will take place on **Thursday December 4th, 2025**

The inauguration of the exhibitions 'La nuit obscure de l'âme végétale" and "Le rêve des tourbières" will take place at the **Robert de Sorbon University Library at 6:00pm**, followed by a cocktail reception at **Reims City hall at 8:30 pm** (upon confirmation from the EXEBIO team prior to the event)

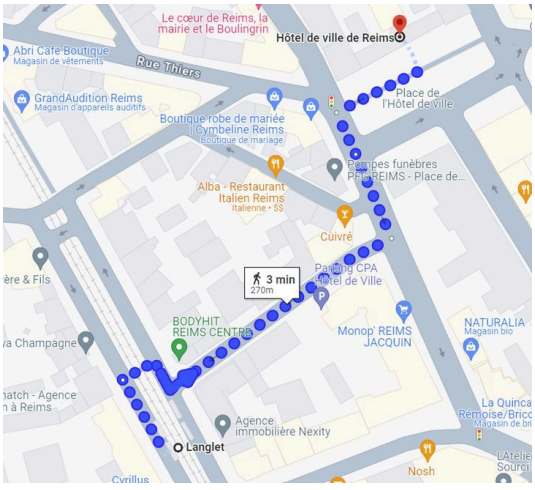
Useful addresses:

Robert de Sorbon University Library : Campus Croix Rouge, Avenue François Mauriac, 51100 Reims (GPS details: 49.2327775, 4.0030714)
City Hall: 9 place de l'Hôtel de Ville, esplanade Simone Veil, 51100 Reims (GPS details: 49.25798797607422,4.031773090362549)

Direction by tram:
Follow direction bellow to reach "Campus Croix Rouge" tram station



Take line A B going to "Neufchatel", exit at "Langlet", the City Hall is located at 3 minutes walking distance.



USEFUL INFORMATION

REIMS CITY

Reims is the most populous city in the French department of Marne, and the 13th most populous city in France. It lies 129 km (80 mi) northeast of Paris on the Vesle river, a tributary of the Aisne.

Founded by the Gauls, Reims became a major city in the Roman Empire. Reims later played a prominent ceremonial role in French monarchial history as the traditional site of the coronation of the kings of France. The royal anointing was performed at the Cathedral of Reims, which housed the Holy Ampulla of chrism allegedly brought by a white dove at the baptism of Frankish king Clovis I in 496. For this reason, Reims is often reffered to in French as la Cité des Sacres ("the Coronation City").

Today, Reims hosts 15 Champagne houses with prestigious names as Taittinger, Mumm, Piper-Heidsieck, Veuve Cliquot or Pommery.

Reims received a special economic boost in 2007 when it was connected to the TGV line between Paris and Strasbourg. This brought Reims closer to the Paris agglomeration and made it increasingly attractive as a place to live and a location for back-office operations of companies from the Paris region.

The cathedral and the old town as well as the surroudings with the vineyards on the slopes of the Montagne de Reims are particularly worth seeing. The introduction of the tramway in 2011 in particular has greatly enhanced the urban development of the city center of Reims.

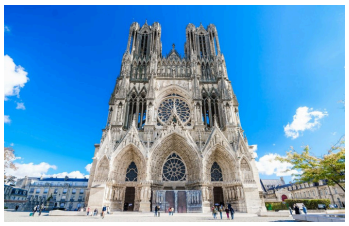
TRANSPORTS SERVICES

Reims has numerous bus routes and two tramway lines serving many parts of the city. For all practical information,
Visit the Grand Reims mobilités website.

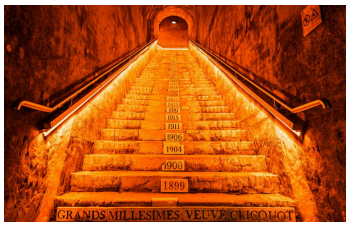
📍 **Useful stations:**

City center and Cathedral: Opéra Cathédrale
Croix Rouge Campus: Campus Croix Rouge
Reims centre Train Station: Gare Centre
TGV Train Station: Champagne-Ardenne TGV

MAIN PLACES



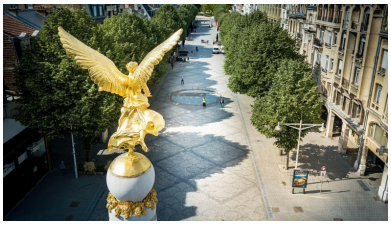
The Cathedral



Champagne cellars

Saint Remi former abbey

Promenade
Jean-Louis Schneiter



Place Drouet d'Erlon

Parc de Champagne

La Maison Fossier

COMMITEES

Partners

Région Grand Est
Communauté Urbaine du Grand Reims
Réseau des établissements d'Enseignement Supérieur et de Recherche de Champagne- Ardenne
Ecole Supérieur d'Art et de Design de Reims
Centre de Recherche et de Formation en Eco-éthologie, URCA
Zone Atelier environnementale rurale en Argonne, CNRS
Bibliothèque Universitaire, URCA
Service Universitaire d'Action Culturelle, URCA
L'Union

A special thanks to:

Direction du Numérique, URCA
Direction de la Communication, URCA
Imprimerie Centrale, URCA

ORGANIZING COMMITTEE

Institut International en Bioéconomie et Environnement EXEBIO, URCA - *Emmanuel GUILLON, Hélène LACROIX, Célia GRENIER, Louis ALBERT, Amélie BIZALION, Ophélie FRIMIN, Laure HOENEN, Lina LAHMAR, Perrine PRÉVOT-LIGER, Pauline RAPINAT, Danushsri RINGASAMY, Mélanie VANIN*
Doctoral Schools Coordination, URCA - *Pauline Loyaux, Nina Bogataïa*
ABIES Doctoral School, URCA - *Caroline Rémond*
Direction of External Relations and International Development, URCA - *Romane Genon, Narjis Laoufi, Alpin Charbaut and Philippine Henry*
INVEST European Alliance - *Darlis Mojarrieta-Castaneda, Roy Ibrahim, Hélène Goeury*

SCIENTIFIC COMMITEES

UR 6292 CRIEG, URCA - *Jean-Marc Bascourret, Jean-Luc Petitjean, Franck-Dominique Vivien, Sylvie Benoit and Julien Vastenaekels*
UMR INRAE A 614 FARE, URCA - *Bernard Kurek and Caroline Rémond*
UMR-I 02 SEBIO, URCA - *Claudia Cosio and Melissa Palos-Ladeiro*
UMR CNRS 7312 ICMR, URCA - *Emmanuel Guillon, Fabienne Grellepois, Pedro Lameiras and Stéphanie Sayen*
UMR CNRS 7331 GSMA, URCA - *Lilian Joly*
UR 7548 ITheMM, URCA - *Catherine Lacoste, Hervé Pron*
USC INRAE 1488 RIBP, URCA - *Stéphan Dorey, Sandrine Dhondt-Cordelier and Olivier Fernandez*
UR 7509 IRMAIC, URCA – *Arnaud Pommier*

Financé par