UMONS Université de Mons

Université Polytechnique HAUTS-DE-FRANCE

Eunice EUROPEAN UNIVERSITY

RESEARCHERS' TUESDAY

Abstract book of the 13th edition in Mons, Belgium

Full version

March 17, 2026

CorSci UMONS

Contents

The 13th edition in Mons is special to me. Besides the obvious number question, it is at least my fourth participation in the event organization. And it is also my last as president of the UMONS scientific staff.

Oh, how we fought to make this one happen. The availability of the venue. The date of the event. A surgery planned for myself at the last minute for this very day (fortunately, moved to another date). And yet, here we are. And we're...

Going international

The 12th and 11th editions in Mons were already going international. First, we included posters from our European university Eunice, then we had the Italy-themed event.

This edition is the one that renames the event. Renaming the event hadn't happened since "Matinée des Chercheurs" (Researchers' morning) had become "Mardi des Chercheurs" (Researchers' Tuesday). For a variety of reasons, this had been coming for quite a while, and I'm damn proud it is happening this year.

This edition proposes the first abstract book in English since the beginning of the event. It is also the one that welcomes the most Eunice participants. In short, we're going international.

What Researchers' Tuesday is about

Researchers' Tuesday is about making connections. Connections with colleagues from other labs. Connections with other fields that use similar methodologies. Connections with other universities.

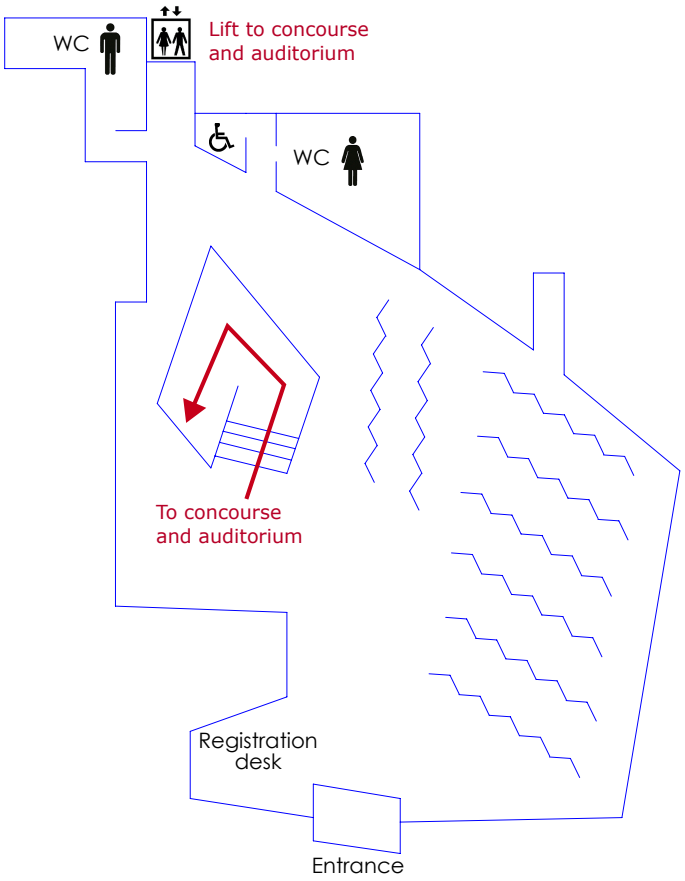
Researchers' Tuesday is about having fun with fellow researchers. Today, prizes are awarded by peers, fresh researchers usually in your age and experience range. No pressure. No peer review. A first leap in a scientific event.

Now go, and have fun!

Lucas Equeter

Time	Event	Location
08:30	Registration & poster setting (coffee on the concourse)	Main hall
09:00	Opening	Auditorium
09:15	Poster Session A	Main hall
10:30	Coffee Break	Concourse
10:45	Poster Session B	Main hall
12:00	Lunch	Concourse
13:15	Poster Session C	Main hall
14:30	Coffee Break	Concourse
14:45	Show Your PhD	Auditorium
16:00	Award Ceremony & Closing	Auditorium

Venue map



The staircase and the lift both lead to the concourse, where the meal and coffee will be served. The auditorium is accessed from the concourse. A reduced mobility access to the auditorium is also available via the left-hand side of the concourse.

Need a quiet space? Besoin de calme ? The *auditorium* is unused during poster sessions and lunch. You are welcome to sit quietly in that room. However, please refrain from consuming the meal in the auditorium.

Need help locating a poster or a category? All info is at the registration desk!

Why is the room shape so odd? Don't ask me, ask the architect.

Competitions and prizes

Several prizes are awarded during this Researchers' Tuesday:

- Best poster (all categories)
- Best poster per category:
  - Energy & Industrial Processes
  - Engineering & Digital Sciences
  - Materials, Chemistry & Nanotechnologies
  - Health and Biomedical Sciences
  - Life Sciences & Environment
  - Humanities & Social Sciences
- Best Eunice poster
- One lucky winner among those who correctly identified the bogus poster (see next page).
- Participation to "Show your PhD!"

Don't forget to vote for the best poster, and try identifying the bogus poster, with the voting ballot you received upon arrival.

Bogus poster

The Researchers' Tuesday is an event designed to help you discover new horizons by meeting researchers from all disciplines and, perhaps, to spark unexpected scientific collaborations between researchers from fields that have no apparent common ground.

With dozens of posters displayed across an area as large as the WCCM, it would be very easy to give in to temptation and stick to the topics we are already familiar with, thereby missing one of the founding principles of the event: the discovery of other fields of research.

To help you resist this temptation, the Researchers' Tuesday organizing committee has decided to spice things up by hiding an impostor among the posters: the 'bogus' posters. They look like real posters, perfectly innocent, they are presented by real people – but they are not genuine scientific posters.

Which poster is it? Only a few members of the organizing committee know the answer, and they have sworn not to reveal it, not even under torture.

Your mission is to find it and discreetly write the number of the suspected poster on your voting ballot before slipping it into the ballot box available at the entrance. One lucky winner will be drawn at random from the correct answers at the end of the day and will receive a magnificent prize!

Feel free to search far and wide to find this poster – and remember, if you do find it, keep it to yourself!

Happy hunting!

Why do we make a fake poster in a scientific event? is likely the most frequently asked question.

- Because we live in an era where more and more scientific papers are retracted due to data fabrication, data falsification, or other research misconduct. This means we cannot take scientific production's trustworthiness for granted
- Because in this era we need to question ourselves on the epistemology of our fields. How do we know what we know? What are the limitations to our findings?
- Because Researchers' Tuesday has been pulling this trick with various success since the mid 2000s at least.
- Because it is a nice excuse to have you look at all posters and look for telltales.
- Because a scavenger's hunt is always fun.
- Because it's a nice excuse to give out another prize.
- Because why not.

But what if you make me doubt my colleague's work? Then we've made a great point. Given the number of retractions of scientific papers these days, you should never take any work for granted. Even people you look up to.

But what if people assume my poster is the fake one? Shame on them. But we promise: those who count the votes were sworn to secrecy. For the record, the organizer's poster was most voted fake in 2024. He didn't care one minute. Go ask him about it.

Show your PhD!

Show your PhD is a competition taking place during Researchers' Tuesday, organized by UMONS in collaboration with the Université Polytechnique Hauts-de-France. Culture and Research have been combined since the creation of this competition as part of Mons 2015, European Capital of Culture.

Show your PhD is open to any researcher from any discipline and aims to have participants present their thesis or research topic in an artistic way. Participants have complete freedom regarding the format. They are invited to draw, film, photograph, choreograph, or represent the subject of their research work through any other artistic medium. A clear link between the thesis and the presented work must be demonstrated and clearly explained during the artistic performance.

Come cheer up your colleagues at 2:45 in the auditorium!

Énergie & Procédés industriels – Energy & Industrial Processes

A01 – Pulvérisation magnétron réactive pour la synthèse de films minces à base de zircone utilisés comme électrolyte solide dans les applications en pile à combustible à oxyde solide (SOFC)

Speaker: BENA BODIONG Geneviève Brenda

Co-authors and additional affiliation info: BENA BODIONG Geneviève Brenda[1,2], Aurelie ROLLE[2], Marielle HUVE[2], Rose-Noelle VANNIER[2], Stéphanos KONSTANTINIDIS[1]. / [1]ChIPS (Chimie des Interactions Plasma Surface); [2]UCCS (Unité de Catalyse et de Chimie du Solide)

La demande électrique croissante ($\sim 2.8\,\%$/an), due à la croissance démographique et à l'essor de l'IA et des centres de données, nécessite des solutions bas carbone. Les SOFC offrent un haut rendement mais sont limitées par les électrolytes en zircone stabilisée à l'yttrium (YSZ), en raison de contraintes d'approvisionnement et de pertes ohmiques dépendantes de l'épaisseur. Ce travail porte sur la synthèse de couches minces de zircone riches en lacunes d'oxygène par pulvérisation magnétron réactive (cible Zr, Ar/O_2). Le régime de transition, identifié via la tension cible, permet leur formation mais exige un contrôle précis. Les films ($300\,\mathrm{nm}$ to $800\,\mathrm{nm}$) montrent une photoluminescence ($\sim 370\,\mathrm{nm}$ et $447\,\mathrm{nm}$). La diffraction des rayons X en incidence rasante confirme une phase cubique stabilisée.

B01 – Modeling the CO_2 valorization into e-kerosene through Fischer-Tropsch synthesis with and without specific reverse water-gas shift catalysts

Speaker: BRUNEAU Valentin

Co-authors and additional affiliation info: Valentin BRUNEAU, Diane THOMAS, Guy DE WEIRELD

This work models CO_2 valorization into e-kerosene via Fischer–Tropsch (FT) synthesis, comparing process configurations with and without a reverse water–gas shift (rWGS) catalyst. Two flowsheets are studied. In the first, an rWGS reactor converts CO_2 to CO to generate syngas, which is then converted into jet-range hydrocarbons through FT synthesis. In the second, only an FT catalyst is used; rWGS can still occur as a side reaction, enabling a direct conversion from CO_2 to e-kerosene in a single catalytic step. Both routes are evaluated under identical operating constraints to quantify impacts on conversion, selectivity, energy demand, and recycle requirements. Results highlight key trade-offs guiding catalyst choice and process design.

C01 – Multiphysics modelling of CO_2 electroreduction to formate: investigating the effect of feed composition

Speaker: CRISTINA González-Fernández

Co-authors and additional affiliation info: C. González-Fernández[a], C. Peralta[b], J. A. Abarca[a], E. Santos[b], G. Díaz-Sainz[a], A. Irabien[a]
[a]Departamento de Ingenierías Química y Biomolecular, Universidad de Cantabria, Avda. Los Castros, s/n, 39005 Santander, Spain; [b]Apria Systems S.L. Parque Empresarial de Morero, 39611 Guarnizo, Spain

In this study, a three-dimensional steady-state model is developed in COMSOL Multiphysics 6.2 to investigate the effect of the CO_2 partial pressure in the feed stream on its electrochemical conversion to formate. The model is experimentally validated, and couples electrochemical kinetics with species transport to capture the electrolyzer performance. Simulations reveal how CO_2 and formate distribution in the catalyst layer evolve as the inlet CO_2 concentration varies from $40\,\%$ to $100\,\%$ (v/v). These results provide mechanistic insights into the operating regimens (i.e., kinetically controlled or mass transport limited) and offer guidance for the design and operation of CO_2 electrolyzers.

A02 – Lime carbonation in dolomitic refractory – Comparison study between calcined dolomite and dolomitic refractory wastes

Speaker: DUTRANOIT Emeric

Co-authors and additional affiliation info: Dutranoit Emeric[1], Dr. Debuysschere Robin[2], Prof. Gonon Maurice[1], Prof. Delaunois Fabienne[1]. / [1]UMONS; [2]CTP

Magnesium is a strategic resource for European industry. As the lightest structural metal, it is highly used in transport applications, defence and aerospace sectors... Today, the EU depends on China for $97\,\%$ of its Mg supply, making alternative and sustainable production routes crucial. The FREEDOM project aims to produce metallic magnesium from recycled dolomitic refractory waste ($MgO \cdot CaO$). The key challenge lies in the selective separation of MgO and CaO through magnesium dissolution in carbonic acid. It previously requires CaO carbonation preventing its dissolution and enhancing Mg purity. This study compares lime carbonation in calcined dolomite and dolomitic refractory wastes.

B02 – CuO and Cu/Cu_2O-based gas diffusion electrodes for electrochemical CO_2 reduction in membrane electrode assembly

Speaker: ELEUTERIO FALSETTI Paulo Henrique

Co-authors and additional affiliation info: Paulo Henrique Eleuterio Falsetti[1,2], Jéssica Cristina de Almeida[3], Vagner Romito de Mendonça[2], Guillermo Díaz-Sainz[1]. / [1]University of Cantabria; [2]Federal University of São Carlos; [3]Embrapa Instrumentation, São Carlos, Brazil

CO_2 electrochemical reduction is a strategy for carbon mitigation and energy storage. This work reports gas diffusion electrodes (GDEs) based on CuO and Cu/Cu_2O catalysts, synthesized via a solvothermal route, both with and without monoethanolamine. Structural characterization confirmed phase-controlled catalyst formation. The GDEs performance was evaluated in a membrane electrode assembly under galvanostatic conditions. The main gaseous products were H_2 and CO, while formate was the liquid product. Although CO production decreased over time for both catalysts, the Cu/Cu_2O composite showed higher formate selectivity and energy efficiency, operating at lower cell potential, highlighting its potential for sustainable CO_2 conversion.

C02 – Procédé de lixiviation et essais d'électrodéposition de métaux valorisables de batteries Li-ion en fin de vie en milieu solvométallurgique

Speaker: INAME Ali

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Les solvants eutectiques profonds (SEP) à base de chlorure de choline apparaissent comme une alternative plus écologique aux solvants conventionnels pour la lixiviation et la récupération des métaux issus des batteries Lithium-ion. Cette étude examine la mise en solution du lithium, du cobalt, du nickel et du manganèse, ainsi que leur récupération par électrodéposition. Les résultats montrent que le SEP chlorure de choline–acide lactique (1:2) permet une lixiviation efficace des métaux, atteignant jusqu'à $100\,\%$ et augmentant avec la température et le temps. Par ailleurs, le SEP chlorure de choline–urée (1:2) permet leur récupération par voie électrochimique.

A03 – Edge-Based Virtual Sensors for Grid-Connected PV Inverters

Speaker: LÓPEZ Julia

Co-authors and additional affiliation info: Julia López[1], Paula Lamo*[1]. / [1]Departamento de Tecnología Electrónica, Ingeniería de Sistemas y Automática, Universidad de Cantabria, 39005 Santander, Spain

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Photovoltaic inverters connected to the grid are critical distributed assets, but current monitoring and data exploitation rely on centralized telemetry, which is inefficient at scale. This work proposes the use of virtual sensors at the edge by reusing signals already available in embedded inverter controllers, particularly grid synchronization observables, to generate events and semantically meaningful indicators at the source. This approach reduces data transmission needs while providing interpretable, audit-ready information. From a data economy and governance perspective, it supports regulatory compliance and aligns with European industrial data frameworks by enabling traceable and purpose-driven data sharing in intelligent distributed energy systems.

B03 – Assessing the Impact of Architectural KPIs on Energy Community Demand: An Archetype-Based UBEM Approach

Speaker: MAHFOUD Chadi

Co-authors and additional affiliation info: Chadi Mahfoud, PhD candidate

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Energy Communities (ECs) are promoted as democratic, decentralized energy systems, yet limited research links architectural parameters to community-scale energy performance. This study examines how selected architectural KPIs and spatial configurations influence EC energy demand using an archetype-based, KPI-driven simulation framework in DesignBuilder. A conceptual phase models a minimal Belgian peer-to-peer EC of two adjacent single-family houses, integrating Walloon building stock, climate, and user profiles. A validation phase calibrates a real Spanish EC building and applies

efficiency measures derived from simulations. Results quantify the impact of architectural KPIs and support future urban-scale alignment between energy demand and renewable energy production.

C03 – Etude expérimentale, modélisation et optimisation du système de management thermique de pile à combustible en architecture multi-stacks

Speaker: MARET Lucas

Co-authors and additional affiliation info: Lucas Maret[1], Céline Morin[1], Jérémy Basley[1], Eric Delacourt[1], François Delcourt[1], Michael Deligant[2]. / [1]LAMIH; [2]LIFSE

La gestion thermique des piles à combustible est une thématique importante car une température trop élevée endommage la pile et une température trop faible nuit au rendement global. Ceci est d'autant plus important dans la mobilité lourde à faible vitesse, nécessitant une grande quantité d'énergie et limitant le flux d'air (donc le refroidissement). Ce travail vise donc à comprendre, caractériser et optimiser la boucle de refroidissement d'une pile à combustible en échelle multi-stacks. Pour ce faire, un modèle de pile à combustible et de boucle de refroidissement est développé. Des essais sur un banc pile à combustible seront effectués afin de valider les modèles. Par la suite, un banc boucle de refroidissement sera développé.

A04 – Effect of EAF slag basicity and chromium content on steel-slag equilibrium

Speaker: NITELET Valentin

Co-authors and additional affiliation info: V. Nitelet[1], A. Mégret[1], J-C. Pierret[2], V. Vitry[1]. / [1]Metallurgy Department, Faculty of Engineering, UMONS-University of Mons, Belgium; [2]Centre de Recherche Métallurgique, Liège

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La production d'acier inoxydable se fait principalement par voie électrique dans un four à arc électrique. Cette méthode de fabrication présente l'avantage de diminuer la production de dioxyde de carbone et la possibilité de recycler ce matériau. Durant le procédé, des charges d'acier et d'éléments d'addition sont fondues et une phase de raffinage par injection d'oxygène prend place pour enlever les impuretés. Cette dernière étape est à optimiser pour limiter l'oxydation du chrome. Dans cet optique, un modèle numérique du procédé est en développement en tenant compte des équilibres chimiques. La méthode CalPhaD est utilisée pour simuler ces équilibres.

B04 – Rethink Energy Communities' Integration and Design of Electricity Strategies

Speaker: QASEM Mohammed

Co-authors and additional affiliation info: Mohammed Qasem[*,2] · Arnaud Davigny[2] · Benoit Durillon[2] · Sesil Koutra[*] · Stephane Brisset[2] / [*] Faculty of Architecture and Urban Planning – University of Mons; [2] Univ. Lille, Arts et Metiers Institute of Technology, Centrale Lille Institute, Junia

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Renewable Energy Communities (RECs) place citizens at the center of the energy transition, enabling them to participate in decision-making processes and manage collectively local energy operations.

While RECs are intended to decentralize energy transitions, the deterministic influence of building morphology on their electricity consumption and production remains critically underexplored. Therefore, this research quantifies the influence of building form indicators on electricity demand and generation to identify cost-effective REC configurations for diverse typologies. These evidence-based guidelines will provide a strategic framework for policymakers and urban planners, effectively aligning spatial configuration with the optimization of collaborative, sustainable energy systems.

C04 – Role of Synergistic Transition Metal Co-Doping in Optimizing Prussian Blue Analogues for Sodium-Ion Batteries

Speaker: SKOWRON Manuela

Co-authors and additional affiliation info: Manuela Skowron, Ewelina Rudnicka, Maciej Galiński, Faculty of Chemical Technology, Poznan University of Technology, Poland

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The rapid expansion of lithium-ion batteries raises concerns about lithium availability and cost, motivating the search for sustainable alternatives. Sodium-ion batteries (SIBs) offer a promising solution due to sodium's abundance and similar electrochemical properties, yet their commercialization is limited by insufficient cathode materials. Prussian Blue analogues (PBAs) are attractive candidates because of their open framework and fast Na^+ transport. Herein, we report a vanadium and cobalt co-doped PBA synthesized via co-precipitation. Structural characterization confirms successful metal incorporation. Electrochemical results demonstrate enhanced capacity, stability, and cycling performance, highlighting synergistic co-doping as an effective strategy for advanced SIB cathodes.

A05 – Structured ETS-10 Adsorbents for Selective CO_2 Capture in Industrial Humid Flue Gases

Speaker: VAN HOVE Morgane

Co-authors and additional affiliation info: Morgane Van Hove[1,2], Ben Sutens[1], Steven Mullens[1], Guy De Weireld[2]. / [1] Flemish Institute for Technological Research (VITO NV), Belgium; [2] University of Mons, Faculty of Engineering (UMONS), Belgium

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Achieving net zero CO_2 emissions by 2050 requires scalable carbon removal approaches such as CCUS, as conventional amine based capture involves significant energy demand and solvent stability issues. Solid adsorbents are being explored as alternatives, although many show reduced CO_2 performance in humid environments. ETS-10, a titanosilicate zeolite, has previously shown stable CO_2 uptake at high relative humidity in powder form, yet its behaviour in structured configurations has not been studied yet. In this work, ETS-10 was deposited on cordierite honeycombs to examine its performance under flue gas humidities. CO_2/H_2O isotherms and breakthrough experiments indicate that the structured material retains measurable CO_2 uptake.

B05 – Le Pays Noir, un Futur Vert ?

Speaker: VANDELOIS Guillaume

Co-authors and additional affiliation info: Guillaume Vandelois[1], Bertrand François[2], Olivier Kaufmann[1] et Pascal Goderniaux[1]. / [1] UMONS; [2] ULiège

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Le sous-sol de l'ancien bassin houiller du Pays Noir est structuré par un réseau complexe d'ouvrages miniers influençant fortement les écoulements d'eau souterraine. Cette recherche vise à caractériser ces écoulements ainsi que les transferts de chaleur dans les zones foudroyées des anciennes mines de charbon. Une modélisation 3D des couches de charbon, des galeries souterraines et des forages recoupant trois niveaux exploités, intégrant des diagraphies, permet de reconstituer la structure du sous-sol. Ces données alimenteront des modèles géomécaniques et thermo-hydrogéologiques afin de caractériser le massif post-minier, évaluer le potentiel de stockage géothermique et ainsi contribuer à la transition énergétique.

C05 – Life Cycle Assessment of CO_2 Capture by Zeolite 13X under Varying CO_2 Purity Targets

Speaker: YAO Yipeng

Co-authors and additional affiliation info: Yipeng Yao, Arnaud Henrotin, Marie-Eve Duprez, Guy De Weireld; Thermodynamics and Mathematical Physics Unit, Faculty of Engineering

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Zeolite 13X, a benchmark CO_2 adsorbent, is expected to replace conventional amine absorption due to lower energy demand and secondary pollution. However, its environmental performance under varying purity constraints remains unclear. This study evaluates the sustainability of $85\,\%$ to $95\,\%$ purity targets using life cycle assessment. Results show that achieving higher purity comes at the expense of intensified environmental impacts and a reduced net CO_2-equivalent reduction rate, highlighting a critical trade-off between product quality and environmental benefit.

Ingénierie & Sciences du numérique – Engineering & Digital Sciences

A06 – On-Street Parking Forecasting with a Spatio-Temporal Graph Neural Network Incorporating Climate and Regulation Signals

Speaker: AGOUBE Ayman

Co-authors and additional affiliation info: Ayman Agoube[1,2], Abdessamad Ait El Cadi[1], Thierry Delot[1], Martin Trépanier[2]. / [1] UPHF, CNRS, UMR 8201 LAMIH; INSA Hauts-de-France; [2] Polytechnique Montréal; CIRRELT

On-street parking occupancy exhibits strong short-term variability and is jointly driven by weather conditions and local parking regulations. We present a climate- and regulation-aware spatio-temporal graph neural network (SSTGNN) that learns temporal dynamics while modeling interactions between curbside blocks. Beyond historical occupancy, the framework incorporates exogenous features describing climate variability (temperature, precipitation, and extreme-weather indicators) and regulation states (paid/prohibited periods and their activation). The model is evaluated on meter-based data from the Ville-Marie borough of Montréal and benchmarked against ARIMA, LSTM, STGCN, and the same SSTGNN architecture without exogenous inputs. Empirical results show improved multi-horizon forecasting accuracy and enhanced robustness across varying conditions.

B06 – How Could You Assess Your 3D Printer's Dimensional Performance in Less Than $30\,\mathrm{min}$?

Speaker: ARISTI GOROSTIDI Unai

Co-authors and additional affiliation info: Unai Aristi Gorostidi[1], Laurent Spitaels[2], Pedro J. Arrazola[1], François Ducobu[2]. / [1] Mondragon Unibertsitatea; [2] UMONS

Since the 1980s, additive manufacturing has grown rapidly as a game-changing technology; material extrusion stands out for low cost, speed, and minimal waste. However, minor process variations can affect part quality, highlighting the need for monitoring. In this study, an approach for assessing dimensional machine performance was developed. The method involved printing companion parts and measuring them using a micrometre. It enabled short-term machine performance evaluation in less than $30\,\mathrm{min}$ using only $4\,\mathrm{g}$ of PLA. Machine comparison, performance classification according to standard tolerance grades, and identification of underperforming axes for preventive maintenance were demonstrated.

C06 – Planification collaborative décentralisée des chaînes logistiques en symbiose industrielle

Speaker: BENCHARI Soukaina

Co-authors and additional affiliation info: Soukaina Benchari, UPHF, CNRS, UMR 8201, LAMIH, 59313 Valenciennes, France

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Comment les entreprises peuvent-elles parvenir à un accord stable et mutuellement bénéfique sur le partage des coûts d'un échange de sous-produits, sans révéler leurs informations de coûts privées à leur partenaire ni à aucun coordinateur central ?

A07 – CSD-AFNet: Computationally Efficient Atrial Fibrillation Classification from ECGs Using 2D Causal Strided Dilated Convolutions

Speaker: BONTINCK Lennert

Co-authors and additional affiliation info: Lennert Bontinck; Aranka Steyaert; Hongbing Chen; Tom Dhaene; Dirk Deschrijver

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Deep learning models for atrial fibrillation (AFib) classification often face high computational barriers due to excessive parameters and FLOPs. This paper introduces CSD-AFNet, an efficient model utilizing Feature-Preserving Pooled Convolutions (FPP-Convs). By combining striding and dilation without feature loss, FPP-Convs maintain temporal coverage while drastically reducing costs. Tested on CODE-15% and PTB-XL datasets, CSD-AFNet matches state-of-the-art accuracy while reducing parameters by $71\times$ and FLOPs by $122\times$ compared to ResNet-10 baselines. These results demonstrate CSD-AFNet's potential for resource-constrained training and deployment on medical edge devices for scalable AFib monitoring.

B07 – Développement d'architectures d'IA multimodales et multitâches pour la surveillance embarquée des systèmes ferroviaires

Speaker: BOUKETTA Ammar

Co-authors and additional affiliation info: Ammar Bouketta[1,2]. / [1] Université Polytechnique Hauts-de-France (UPHF), LAMIH UMR CNRS 8201, Valenciennes, France; [2] Alstom Transport, France

This PhD research focuses on the development of multimodal and multitask artificial intelligence architectures for embedded railway system monitoring. The objective is to detect anomalies in onboard subsystems (e.g., passenger doors, HVAC, traction) by leveraging heterogeneous data sources such as signals, operational logs, and contextual information. The work emphasizes representation learning, temporal modeling, and hardware-aware deployment constraints to ensure real-time and energy-efficient implementation in industrial environments. By integrating multimodal fusion strategies and anomaly detection mechanisms, this research aims to improve reliability, predictive maintenance, and safety in modern railway transportation systems.

C07 – Cutting Tool Condition Monitoring with Artificial Intelligence

Speaker: COLANTONIO Lorenzo

Co-authors and additional affiliation info: Lucas Equeter, Pierre Dehombreux & François Ducobu, UMONS – FPMS – GMECA

In the manufacturing industry, the state of the cutting tool is of crucial importance. During machining, the tool inevitably degrades leading to production of suboptimal parts. The degradation of the tool is due to different mechanisms occurring simultaneously thus predicting in advance the evolution of the degradation of the tool is impossible. Therefore, we propose to monitor in real time the degradation of the cutting tool with artificial intelligence (AI) by instrumentalizing the machine with different sensors. The sensors signals are processed by AI to estimate the state of the tool and lead to its replacement at the optimal time.

A08 – Thorax sous impacts balistiques : modélisation numérique et physique

Speaker: DANCEREL-BOURLON Elodie

Co-authors and additional affiliation info: Elodie Dancerel-Bourlon[1], Rémi Delille[1], Benjamin Bourel[1], Olivier Mauzac[2], Cynthia Bir[3], Donald Sherman[3], Nicolas Prat[4], Sébastien Roth[5], Franck Lauro[1,6]. / [1] LAMIH; [2] CREL; [3] WSU; [4] IRBA; [5] UTBM; [6] INSA

L'objectif est de contribuer au développement d'un outil de prédiction lésionnelle du corps humain sur différents constituants anatomiques lors d'un traumatisme thoracique fermé. Plusieurs scénarios d'impacts balistiques ont été recréés expérimentalement sur le substitut thoracique biofidèle SurHUByx, et numériquement avec son équivalent, SurHUByx FEM. La variabilité interindividuelle décrite dans les scénarios a été prise en compte grâce à une normalisation des données par l'indice de masse corporelle. Puis, des courbes de risque lésionnel ont été établies pour chaque organe par analyse de survie. Les critères et seuils obtenus seront alors utilisés pour la caractérisation des systèmes de protection balistique.

B08 – Robotic Machining and Applications: An Introduction to Flexibility in Robotic Machining

Speaker: DANTINNE Hugo

Co-authors and additional affiliation info: Hugo Dantinne[1], Valentin Dambly[2]. / [1] UMONS; [2] IDEKO

Robotic machining is increasingly used in modern manufacturing for its adaptability and cost efficiency. Unlike traditional CNC machines, industrial robots can be quickly reprogrammed to perform tasks such as painting or milling complex shapes. This makes them well suited for small-batch production, prototyping, and frequently changing designs. However, robots have lower stiffness and accuracy than CNC machines, which reduces machining quality under high cutting forces. To overcome these limits, solutions such as improved calibration, force control, and hybrid systems with sensors or positioning platforms have been developed. This poster introduces robotic machining and the challenge of flexibility in industrial robots.

C08 – Calcul exact des inerties de torsion et de gauchissement.

Speaker: DATOUSSAÏD Sélim

Co-authors and additional affiliation info: Sélim Datoussaïd

Pour les profils à parois minces ouverts, la connaissance précise des inerties de torsion et de gauchissement est primordiale pour la prédiction des déformations et des instabilités. La présente recherche se concentre sur le calcul exact des fonctions géométriques de gauchissement. Elles permettent de calculer l'inertie de torsion uniforme, l'inertie de gauchissement, les déformations des sections gauchies et les coefficients géométriques de stabilité. La méthode proposée est basée sur la résolution de l'équation de Poisson avec des conditions limite de Neumann. Une condition d'unicité doit être associée en se basant sur la cinématique globale de la section.

A09 – Estimation de la durée de vie restante des isolations électriques dans les enroulements de moteurs à partir des indicateurs mesurés

Speaker: DJEDDOU Nesrine

Co-authors and additional affiliation info: Nesrine Djeddou[1,2], Olivier Deblecker[1], Bashir Bakhshidehzad[1], Fabrice Morganti[2], Stéphane Duchesne[2]. / [1] Univ. Mons, Electrical Power Engineering Unit (EPEU), Mons, 63232, Belgique; [2] Univ. Artois, UR 4025, Laboratoire Systèmes Électrotechniques et Environnement (LSEE), Béthune, F-62400, France

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La durée de vie des machines électriques dépend fortement de la dégradation de l'isolation des enroulements du stator. Des techniques non destructives, comme la mesure de la capacité et l'analyse des décharges partielles (DP), permettent de suivre cette dégradation. Cette étude propose une méthodologie pour prédire la durée de vie restante des systèmes d'isolation à partir d'indicateurs mesurés. Quatre modèles d'intelligence artificielle ont été développés pour estimer la vie de l'isolation via l'évolution de la tension d'amorçage des DP (PDIV). Le modèle SVR a obtenu les meilleures performances ($R^2 = 0{,}974$). L'étude distingue les effets électriques et thermiques et montre que PDIV et capacité parallèle (Cp) apportent des informations complémentaires sur les mécanismes de vieillissement.

B09 – Defect Imaging and Scattering Cross Section Estimation via Lamb Wave Beamforming and Reverberation Processing

Speaker: FARHA Elie

Co-authors and additional affiliation info: Elie Farha, Lynda Chehami, Emmanuel Moulin, Nikolay Smagin, Université Polytechnique Hauts-de-France

In classical nondestructive testing, only the first wave arrivals are taken into account, whereas the reverberations are usually discarded. In this work, we aim to exploit these reverberations to compute defect scattering cross section using a statistical model for reverberation developed in previous works [1]. The results are validated with Norris and Vemula's theoretical work [3], as well as with direct computation (using the first arrived wavepackets). In addition, we present high quality imaging based on beamforming [2] applied to Lamb Waves. Finally, a defect classification plan that relies on exploiting imaging and scattering characteristics is proposed.

C09 – Dimensionnement de systèmes de refroidissement par projection d'huile – Applications au refroidissement de machines électriques automobiles

Speaker: HYPOLITE Luc

Co-authors and additional affiliation info: Julien Pelle[1], François Beaubert[1], Maxime Balligand[2], Cédric Ledieu[2]. / [1] LAMIH, UPHF; [2] Novares

Le sujet porte sur le refroidissement, par projection d'huile, de composants électriques ou mécaniques d'une machine électrique tournante. Les propriétés diélectriques d'huile permettent de les utiliser comme fluide caloporteur, en contact direct avec des composants soumis à un champ électrique ou magnétique (ou à proximité). L'amélioration du refroidissement de ces composants va permettre d'optimiser leurs conditions de fonctionnement et leurs designs. Cette problématique nous amène à nous intéresser au refroidissement d'une surface par impact de jets d'huile.

A10 – Contribution à la prédiction du risque lésionnel de la tête lors de chocs localisés : caractérisation et modélisation personnalisées d'impacts balistiques non pénétrants

Speaker: LAFOND Camille

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Le projet de thèse vise à prédire les lésions crâniennes derrière un casque suite à un impact balistique. Pour cela, plusieurs étapes ont permis de développer un modèle numérique par éléments finis du crâne humain, capable de simuler les contraintes subies lors d'un impact. Ce modèle sera personnalisable en fonction des caractéristiques propres à chaque individu (géométrie et propriétés mécaniques). Enfin, le modèle numérique sera couplé à une tête physique, équipée de capteurs d'efforts selon différents angles de tir afin d'établir une fonction de transfert reliant les résultats expérimentaux et les lésions subies par l'individu.

B10 – MeDS4Robots Digital Shadows for Early Detection of Dysfunctions in Robotic Machining

Speaker: LEROY Florian

Co-authors and additional affiliation info: Florian Leroy, Edouard Rivière et Bryan Olivier, UMONS

Robotic machining offers a cost-effective, versatile solution for manufacturing large, complex components in sectors like aerospace. However, the inherent low stiffness of serial robots leads to accuracy-compromising deformations and vibratory instabilities not seen in traditional CNC tools. This project aims to overcome these barriers by developing an advanced digital shadow for high-fidelity numerical simulation. Building on an existing flexible multibody model of a robot coupled with a macroscopic cutting force model, the research focuses on accurately simulating faulty machining states, including tool wear, breakage, and chatter, across the robot's entire machining space. These simulations will provide essential reference signals to enable real-time detection and automated corrective strategies.

C10 – Mechanistic Cutting Force Model: Identification of Cutting Coefficients in Finish Milling of Polylactide (PLA) 3D-Printed Parts

Speaker: LORENZONI Margaux

Co-authors and additional affiliation info: Margaux Lorenzoni[1], Edouard Rivière-Lorphèvre[1], Laurent Spitaels[1], Jérémy Odent[2], François Ducobu[1]. / [1] Machine Design and Production Engineering Lab – Research Institute for Science and Material Engineering – University of Mons; [2] Laboratory of Polymeric and Composite Materials (LPCM) – Center of Innovation and Research in Materials and Polymers (CIRMAP) – University of Mons

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Finishing 3D printed parts can improve their surface quality and dimensional accuracy, but polymers such as PLA raise challenges due to their low melting temperature and thermal conductivity, which influence cutting behavior. Cutting force models for polymers remain limited despite their importance in milling reliability, especially with the rise of hybrid manufacturing systems. This study develops a mechanistic cutting force model for PLA using inverse identification of cutting coefficients from measured forces. Milling tests with varied feeds, speeds, and cutting fluid conditions support the model development. The strong agreement between simulations and experiments under stable conditions confirms the model applicability.

A11 – Indirect Additive Manufacturing of Gradient Composition Object for Drilling Applications

Speaker: MAGAZZU Alessandro

Co-authors and additional affiliation info: A. Magazzu, V. Vitry, A. Mégret, UMONS

Dans l'industrie extractive, notamment le forage minier ou la production d'énergie, les inserts diamantés doivent répondre à des exigences élevées de fiabilité et de performance impliquant la conception de pièces complexes. Les procédés de mise en forme « near-net-shape » constituent une solution prometteuse. Parmi les différents procédés, le gel casting est une technique largement étudiée. Ce projet vise le développement de pièces en carbure de tungstène cémenté-diamant à gradients de composition par le procédé de gel casting. Les principaux enjeux concernent l'élaboration de formulations stables sans sédimentation et permettant le coulage, l'optimisation du séchage et des traitements thermiques.

B11 – Optimizing Reverse Logistics Collection: An Emission-Conscious Location–Routing Model with Driver Well-being Constraints

Speaker: MOZHGAN Jahanafroozi

Co-authors and additional affiliation info: Director: Pr. Abdelhakim Artiba[1], Co-director: Pr. Joseph Sarkis[2], Co-Supervisors: Pr. Abdessamad Ait el Cadi[1], Dr. Abdelghani Bekrar[1]. / [1] LAMIH; [2] WPI

This research addresses sustainable reverse logistics collection by proposing a capacitated location–routing problem for pickup operations (CLRP-RL-P). The model jointly optimizes the opening of collection centers, the assignment of collection points, and vehicle routing decisions. It integrates environmental sustainability through load-dependent CO_2 emissions and carbon pricing, and social sustainability through driver well-being constraints, including maximum working time, mandatory breaks, and overtime costs. The problem is formulated as a mixed-integer linear program solved with Gurobi for benchmark instances. To handle larger instances, a matheuristic framework combining clustering, arc pruning, Clarke–Wright savings, variable neighborhood search, and MILP warm-start refinement is developed.

C11 – Two-Stage Distributed Model Predictive Control for Multi-Agent Systems

Speaker: OGUNDIPE Abdullateef

Co-authors and additional affiliation info: Abdullateef Ogundipe[1], Yiwen Chen[1], Michael Defoort[1], Auwal Shehu Tijjani[2]. / [1] LAMIH UMR CNRS 8201, Université Polytechnique Hauts-de-France, Valenciennes; [2] Centre for Digital Systems, IMT Nord Europe, Institut Mines-Télécom, Univ. Lille, Lille

This work proposes a navigation scheme that addresses the problem of collision-free navigation of multiple non-holonomic mobile robots in the presence of non-coupled and coupled state constraints, and input constraints. The scheme named a two-stage distributed model predictive control (DMPC), in the first stage, each agent computes in parallel, a warm-start trajectory as an initialization for the second stage using a less-constrained DMPC. Then, the second stage solves the full-constrained DMPC scheme with local information exchange between neighboring robots. This approach offers a simpler and more travel-time-efficient alternative to previous DMPC techniques. The performance was validated through simulations and experiments.

A12 – An Evaluation Benchmark of Artificial Intelligence Models for Estimating HRTFs from Ear Shape Representations

Speaker: PHILIPPON Alexandre

Co-authors and additional affiliation info: Alexandre Philippon, Loïc Reboursière, Thierry Dutoit

Head-related transfer functions (HRTFs) are fundamental to spatial audio via binaural rendering. Personalized HRTFs have been shown to improve localization accuracy and reduce perceptual artifacts and directional ambiguities. However, acquiring such HRTFs is time-consuming and requires costly measurement setups. This work investigates the use of deep learning models to estimate personalized HRTFs from ear shape representations. We propose and evaluate three different architectures with various types of input data. We compared the spectrums (using LSD) and used an auditory model for a closer to perception evaluation.

B12 – Bridging Data-Driven and Geometric Methods for Nonlinear System Linearization

Speaker: PIASEK-SKUPNA Joanna

Co-authors and additional affiliation info: Joanna Piasek-Skupna, Poznan University of Technology, Institute of Robotics and Machine Intelligence

Modern control of complex nonlinear systems demands methods that combine mathematical rigor with data-driven flexibility. We present a unified framework connecting Koopman operator theory with differential flatness to discover linearizing coordinates directly from measurement data. The key insight is that flat outputs form optimal finite-dimensional Koopman invariant subspaces, enabling exact system linearization with minimal lifted representations. We investigate various learning strategies, including physics-informed dictionaries, polynomial bases, and neural network architectures, and assess their ability to recover the underlying geometric structure. The framework is validated on benchmark nonlinear systems and experimental electromechanical data, demonstrating practical applicability for control design, state estimation, and parameter identification.

C12 – IoVT in Vehicular Networks: Applications, Challenges, and Enabling Technologies

Speaker: REKROUK Maroua (UPHF)

Co-authors and additional affiliation info: Maroua Rekrouk[1], Iyad Dayoub[1], François-Xavier Coudoux[1], Patrick Corlay[1]. / [1] Univ. Polytechnique Hauts-de-France, Univ. Lille, CNRS, UMR 8520 – IEMN – Institut d'Electronique de Microélectronique et de Nanotechnologie, F-59313 Valenciennes, France

The Internet of Video Things (IoVT) is a key enabler of perception-driven vehicular applications, yet its deployment in vehicular networks remains a major challenge. This poster aims to structure and clarify the IoVT research landscape by visually connecting vehicular applications, system-level challenges, and enabling technologies. In particular, it highlights the role of advanced communication and video compression techniques in supporting video-centric vehicular services. A mapping between next-generation vehicular applications and emerging 6G pillars is also provided to offer a forward-looking perspective.

A13 – Analyse, conception et évaluation de système interactif tangible d'aide à la gestion d'espaces de solution avec contraintes : application à des tâches industrielles (Projet TUIConstraint)

Speaker: ROUSSARIE Elie (LAMIH, UPHF)

Co-authors and additional affiliation info: Elie Roussarie[1,2], Sophie Lepreux[1], Nadine Couture[2], Christophe Kolski[1]. / [1] LAMIH UMR CNRS 8201; [2] ESTIAR

Le projet TUIConstraint vise à exploiter des avancées récentes dans les domaines de l'interaction humain-machine et de l'intelligence artificielle. Il s'agit de proposer, concevoir, réaliser et évaluer une interface humain-machine permettant de manière tangible (en manipulant directement des éléments) la gestion d'espaces de solution avec contraintes. Ce système interactif est destiné à un humain ou une

équipe ayant à intervenir dans la résolution de tâches industrielles. Ce projet part sur l'hypothèse que l'incarnation tangible des caractéristiques de l'espace de solution et en particulier de ses contraintes (au sens large du terme), va faciliter les activités de décisions.

B13 – Multitask Prediction for Complex Systems with Functional Covariates

Speaker: SABI GNINKOU Razak Christophe (Université polytechnique Hauts-de France, INSA Hauts-de France, CERAMATHS)

Co-authors and additional affiliation info: Razak C. Sabi Gninkou[1], Andrés F. López-Lopera[2], Rodolphe Le Riche[3], Franck Massa[4]. / [1] Univ. Polytechnique Hauts-de-France, INSA, CERAMATHS; [2] Univ. de Montpellier, IMAG, Inria Lemon; [3] Univ. Clermont Auvergne, CNRS, LIMOS; [4] Univ. Polytechnique Hauts-de-France, INSA, LAMIH

Functional data frequently arise in engineering and statistical applications, where inputs are naturally represented as curves or spatial fields rather than finite-dimensional vectors. We address the problem of jointly predicting multiple outputs from functional covariates using a multitask Gaussian process framework. The model relies on a fully separable covariance structure across tasks and functional inputs, preserving the functional nature of the data while inducing a Kronecker-structured representation for scalable and exact inference. The approach is demonstrated on a realistic mechanical simulation with functional inputs and outputs, delivering accurate joint predictions together with coherent uncertainty quantification.

C13 – Enhancing Cyberresilience in Critical Infrastructures Against AI-Driven Attacks, Post-Quantum Cryptography Risks, and Data Sovereignty Constraints

Speaker: SANTAMARÍA Jesús R. Abascal (Universidad de Cantabria)

Co-authors and additional affiliation info: Jesus Abascal, University of Cantabria

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Protecting critical infrastructures is a fundamental pillar of national security, yet many systems remain unprepared for the emerging cyber threats of the coming decade. This poster highlights the growing gap between current protection models and the evolving threat landscape shaped by AI-driven attacks, post-quantum cryptography risks, and increasing data sovereignty constraints. It examines how artificial intelligence is redefining adversarial capabilities, how quantum computing threatens the foundations of classical cryptography, and why data sovereignty is becoming a strategic requirement. The work advocates for a proactive cyberresilience approach, combining secure AI, cryptographic agility, and resilient architectures to safeguard critical infrastructures against future, high-impact cyber threats.

A14 – IoT-Based Ultrasonic Microsystems for Non-Invasive Vascular Monitoring

Speaker: STEKELOROM Kevin (UPHF)

Co-authors and additional affiliation info: K. Stekelorom[1], W.-J. Xu[2], A. Collet[3], D. Gangur[4], S. Carlier[4], I. Dayoub[1], D. Remiens[2], E. Dogheche[2]. / [1] UPHF-IEMN-INSA HdF; [2] UPHF-IEMN; [3] UMONS-HELORA Mons; [4] HELORA Mons

Cardiovascular diseases remain the leading cause of mortality worldwide, with nearly 20 million deaths annually and 4 million per year in Europe. Conventional vascular Doppler systems are operator-dependent, bulky, and unsuitable for continuous monitoring, limiting integration into connected healthcare infrastructures. This work presents a miniaturized ultrasonic wearable microsystem enabling continuous, non-invasive vascular monitoring within an Internet of Medical Things (IoMT) architecture. The system targets key hemodynamic parameters through optimized Doppler sensing integrated with MEMS-based transducers, low-power electronics, and secure wireless communication. Experimental validation demonstrates accurate wearable blood flow velocity estimation, supporting scalable and continuous cardiovascular monitoring.

B14 – Premier accessoire connecté pour microscope 3D

Speaker: TAKOUKAM Vanessa (UPHF)

Co-authors and additional affiliation info: Vanessa Takoukam, UPHF/LAMIH

L'analyse de surface repose classiquement sur la topographie 3D et l'imagerie en lumière visible, mais certaines informations restent peu perceptibles dans un seul domaine spectral. Ce travail explore l'apport d'une approche multispectrale combinant topographie 3D, lumière visible et ultraviolet (UV). Une architecture adaptable inspirée des systèmes IoT est proposée pour intégrer un anneau d'éclairage UV externe à un microscope de variation de focus, sans modification de l'instrument. Les acquisitions sont synchronisées et combinées en un stack multimodal. Les premiers résultats montrent que l'éclairage UV révèle des contrastes de surface peu perceptibles en lumière visible, ouvrant des perspectives pour l'inspection et la conservation du patrimoine.

C14 – Étude de l'anisotropie des structures Triply Periodic Minimal Surfaces (TPMS) en régime dynamique en couplant modèles réduits, expérimentation et intelligence artificielle (ANIDYN)

Speaker: TRAORE Cheick Ibrahim (UPHF)

Co-authors and additional affiliation info: Éric Markiewicz[1], Yves Chemisky[2], Louise Le Barbenchon[3], Grégory Haugou[1], Hervé Morvan[1]. / [1] LAMIH UMR CNRS 8201, UPHF; [2] Université de Grenoble Alpes; [3] Université de Bordeaux (I2M)

L'objectif de cette thèse est de développer une approche innovante pour concevoir des structures de protection au crash/impact en exploitant l'anisotropie des TPMS (Triply Periodic Minimal Surfaces). Des structures intégrant des gradients géométriques et mécaniques seront étudiées. Leur dimensionnement optimal, pour différentes directions de sollicitation et en régime dynamique rapide, nécessite une modélisation numérique performante. Une campagne expérimentale couplée à des simulations basées sur l'intelligence artificielle permettra de construire des méta-modèles réduits, diminuant les temps de calcul. L'ambition est de relier topologie et comportement mécanique multi-échelle pour optimiser les performances macroscopiques. Travail mené en collaboration avec l'I2M (Carnot Arts).

A15 – Overcoming Spectral Overlap in Cascaded TFBGs for Multipoint Refractive Index Sensing

Speaker: ZHENG Jieqing (UMONS)
Co-authors and additional affiliation info: UMONS

Tilted fiber Bragg gratings (TFBGs) exhibit high refractive-index (RI) sensitivity but their broad spectra hinder wavelength-division multiplexing, restricting them to single-point sensing. This work presents a multi-point RI sensing approach using cascaded bare TFBGs interrogated in a single optical channel. By applying first-order derivative spectrum analysis, individual cut-off modes are effectively separated despite strong spectral overlap. A three-point array demonstrates sensitivities of $52.96\,\mathrm{nm/RIU}$ to $57.53\,\mathrm{nm/RIU}$, linearities of $R^2 = 0.94$ to 0.98, and mutual interference below $0.03\,\mathrm{nm}$, enabling scalable and cost-effective quasi-distributed RI sensing.

B15 – Table de hachage parfaite visant la réduction du stockage pour la correction d'erreurs simples basée sur le CRC

Speaker: ZIANI Zouhair (UPHF)
Co-authors and additional affiliation info: Zouhair Ziani[1,2], Stéphane Coulombe[1,3], François-Xavier Coudoux[2], Patrick Corlay[2]. / [1] ETS; [2] UPHF, INSA HdF; [3] ILLS

Notre travail présente une approche novatrice pour la correction d'erreurs simples (single-bit) dans les messages protégés par CRC, s'appuyant sur une table de hachage parfaite interrogée par syndrome. Les résultats démontrent que notre solution offre un excellent compromis entre complexité algorithmique et ressources mémoire. La performance est rigoureusement évaluée en mesurant le nombre d'opérations de portes logiques à deux entrées, confirmant l'efficacité de cette architecture pour des implémentations matérielles optimisées.

C15 – A Triple-Bottom-Line Approach to the Inventory Routing Framework and Delivery (IRP-PD-TW) in a Closed-Loop Pallet Logistics System

Speaker: ZORMATI Chaima (LAMIH/UPHF)
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A multi-objective mixed-integer linear programming model is proposed to simultaneously minimize total costs, CO_2 emissions, and driver fatigue. The model integrates economic, environmental, and social dimensions within a unified optimization framework. Small instances are solved exactly using Gurobi with a lexicographic approach, while larger instances are tackled using NSGA-II and SPEA2 to approximate the Pareto front. Results highlight trade-offs between sustainability objectives and demonstrate the effectiveness of the proposed approach.

Matériaux, Chimie & Nanotechnologies – Materials, Chemistry & Nanotechnologies

A16 – Smart Coating of TiAlN Thin Film Function as Temperature Sensor for Mechanical Engineering Application

Speaker: AL QORI Mohammad Dani (Polytechnic University Hauts-De-France)

Co-authors and additional affiliation info: Mohammad D. Al Qori[1,2,3], André Dubois[2], José G. La Barbera Sosa[2], Rudy Dubois[2], Shobih[3], Karim Dogheche[1], Erry D. Kurniawan[3], Denis Remiens[1], Mirenxtu Dubar[2], El H. Dogheche[1,*]. / [1] Institut d'Electronique de Microélectronique et de Nanotechnologie, IEMN CNRS UMR 8520, Université Polytechnique Hauts-de-France, Valenciennes, France; [2] Laboratoire d'Automatique, de Mécanique et d'Informatique Industrielles et Humaines, CNRS UMR 8201, Université Polytechnique Hauts-de-France, Valenciennes, France; [3] Research Center for Electronics, National Research and Innovation Agency, Bandung, Indonesia; [*] Corresponding author

We study the effect of deposition conditions on microstructure formation and its direct implications on hardness, as well as the presence of a Ti interlayer on the adhesion properties of TiAlN thin film. The depositions were carried out at room temperature. SEM investigation revealed that an increase in RF power resulted in an increase in the diameter and clearness of the columnar structure. Even though a columnar structure is observable, the existing phase is amorphous. Nanoindentation measurements resulted in the highest hardness due to the presence of columnar structure. Moreover, the increase in RF power indicated a trend toward higher critical lateral load (LC2).

B16 – Texturation des surfaces par laser : analyses morphologiques et mécaniques par indentation

Speaker: AL ZARIF Hassan (Université Polytechnique Hauts-de-France, LAMIH UMR CNRS 8201, Valenciennes, France)

Co-authors and additional affiliation info: Hassan Alzarif, Frédéric Robache, Maxence Bigerelle, Romain Vayron, Alex Montagne, Université Polytechnique Hauts-de-France, LAMIH UMR CNRS 8201, Valenciennes, France

Cette étude examine la texturation de surface du TA6V, alliage largement utilisé en implantologie, par laser femtoseconde. La microtexturation fonctionnalise la surface pour mieux l'adapter à son environnement. Grâce à leurs impulsions ultracourtes, ces lasers offrent une texturation fine et précise, mais l'influence des paramètres procédé reste à clarifier. Après texturation, les propriétés mécaniques seront caractérisées par nanoindentation. La difficulté majeure est d'indenter une surface rugueuse : la topographie perturbe l'estimation de l'aire de contact réelle, rendant l'interprétation des résultats plus délicate.

C16 – Development of Geometrical Qualification Methodologies Dedicated to Multi-Axis Direct Deposition

Speaker: ALFIERI Massimo (Université de Toulon)

Co-authors and additional affiliation info: Massimo Alfieri, Laurent Spitaels, Maxime Chalvin, François Ducobu, Sébastien Campocasso

Robotic based multi-axis additive manufacturing, both in polymers and metals, offers results and flexibility hard to achieve with traditional production systems. However this process is still lacking qualification standards for part quality and production capability assessment. This study aims to investigate errors' sources coming from the robot dynamics and define requirements and methodologies using conventional measuring systems to study geometric and dimensional characteristics. The goal is to have a clear definition of the parameters characterizing the capability of the production

system, one or more test artefacts able to assess the geometrical and dimensional accuracy of parts the system can reproduce.

A17 – Sustainable Anticorrosive Pigments from Mussels Shell By-Products

Speaker: BALABA Nayara (UMONS)

Co-authors and additional affiliation info: Nayara Balaba[1], Julia de O. Primo[1], Marjorie Olivier[2], Rafael Emil Klumpp[2], Carla Bittencourt[1]. / [1] Plasma-Surface Interaction Chemistry (ChIPS), UMONS; [2] Materials Science Department, Faculty of Engineering, UMONS

Mussel production generates large amounts of shell waste, mainly composed of $CaCO_3$, whose poor disposal causes environmental problems. These shells can be valorized as a sustainable raw material for ecofriendly synthesis. In this study, calcined mussel shells were used to produce CaO for the synthesis of metal phosphate pigments doped with Mn or Ni, yielding lilac and yellow colors. Phosphate pigments are known for their strong anticorrosive properties due to metal passivation. Characterizations analyzed confirmed Mn and Ni oxidation states and semiconductor behavior, while XRD showed hydroxyapatite and β-tricalcium phosphate phases, demonstrating effective dopant incorporation and high anticorrosive potential.

B17 – Advanced Strategies for Functionalizing Carbon-Based Nanoarchitectures with Magnetic Centres

Speaker: BARQUÍN Miguel (University of Cantabria)

Co-authors and additional affiliation info: M. Barquín[a], P. González-Izquierdo[a], I. Hernández Campo[a], M. N. Sanz-Ortiz[a], M. de Pedro del Valle[a], C. Moreno[a] / [a] Departamento de Ciencias de la Tierra y Física de la Materia Condensada, Universidad de Cantabria, 39005 Santander, Spain

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On-surface synthesis in ultra-high vacuum is a novel field where chemical reactions are confined to a solid surface. Compared to wet chemistry, this approach provides atomic precision and allows studying intermediate reactions by different characterization techniques. Nonetheless, the lack of control during the on-surface reactions limits long-range order. In this work, we proposed using parallel graphene nanoribbons to guide the arrangement of both metal-ion and free-base organic molecules. Several annealing cycles were performed to laterally fuse the molecules, resulting in a long-range ordered carbon-based nanoarchitecture potentially containing magnetic centres. Each annealing step was characterized by scanning tunneling microscopy and spectroscopy.

C17 – Lab-on-Chip Acoustic Detection Platform: Design, Fabrication and Performance Evaluation

Speaker: BEN ABDELKADER Makrem (IEMN)

Co-authors and additional affiliation info: Makrem Ben Abdelkader[1,2,3], Hatem Dahmani[1], Samuel Dupont[1], Chérif Dridi[3], Julien Carlier[1]. / [1] IEMN – UMR CNRS 8520, Polytechnic University of Hauts-de-France, Valenciennes, France; [2] National Engineering School of Sousse, University of Sousse, 4054, Sousse, Tunisia; [3] NANOMISENE Lab, LR16CRMN01, CRMN of Technopole of Sousse B.P. 334, Sahloul, 4054, Sousse, Tunisia

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This study presents a miniaturized sensing platform that integrates Microelectromechanical Systems (MEMS) with Bulk Acoustic Wave (BAW) technology and PDMS microfluidics. To overcome the limitations of conventional sensors, the device utilizes ZnO transducers fabricated through standard microfabrication and soft lithography. A robust CNC-machined aluminum mold was employed to ensure dimensional accuracy for the microchannels. Experimental results for ethanol concentration monitoring demonstrated high sensitivity and stability. Crucially, the microfluidic integration prevents evaporation of volatile liquids, ensuring precise real-time analysis. This cost-effective, portable solution shows significant potential for environmental applications, such as detecting hydrocarbon pollutants in seawater.

A18 – Sputtering of Silver onto Ionic Liquids: Effect of Ionic Liquid Anion on Nanoparticle Formation

Speaker: BOL France-Emmanuelle (UMONS)

Co-authors and additional affiliation info: France-Emmanuelle Bol, Stéphanos Konstantinidis, UMONS

Metal nanoparticles were synthesized by low-pressure magnetron sputtering of silver atoms into ionic liquids to investigate the role of the liquid medium in nanoparticle growth. Silver was deposited into BMIM-TFSI, BMIM-BF_4, and their mixtures, while operando UV–Vis spectrophotometry monitored nanoparticle formation. TFSI-rich liquids promote efficient nucleation and stabilization of small, well-dispersed nanoparticles, evidenced by stable plasmon resonances. Increasing BF_4^- content induces plasmon red-shifts, indicating enhanced growth and aggregation. These results demonstrate that ionic liquid anion chemistry critically controls nucleation, coalescence, and final nanoparticle size during sputtering.

B18 – Projet Al2SiBuild

Speaker: CARDINAL Robin (Faculté Polytechnique UMONS)

Co-authors and additional affiliation info: Robin Cardinal, UMONS – FPMs

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L'objectif du projet Al2SiBuild est de faire face aux enjeux climatiques et économiques par une collaboration transfrontalière promouvant un secteur de la construction circulaire et durable. Le projet cherche à démontrer le potentiel de matériaux bas carbone basés sur des liants et bétons géopolymères et alcali-activés. L'UMONS s'occupe de la cartographie et de la caractérisation des ressources argileuses dans la zone Interreg FWVL pour ensuite sélectionner les gisements adaptés à une production locale de ces matériaux. Al2SiBuild regroupe CRIBC-CWOBKN, Buildwise, UMONS, UGent, IMT Nord Europe, Centrale Lille, Neo-Eco et Materia Nova.

C18 – Development of Polymer-Based pH Sensors for Wound Healing Monitoring

Speaker: CHACHIA Houria (UMONS-Polytech)

Co-authors and additional affiliation info: Houria Chachia, Marc Debliquy, Marjorie Olivier, Sciences des Matériaux, Polytech UMONS

Chronic wounds, notably diabetic foot ulcers, require continuous monitoring due to high infection risk and impaired healing. This work presents a flexible smart dressing integrating a polyaniline (PANI)-based pH sensor for real-time evaluation of the wound microenvironment. The pH-sensitive PANI film, deposited on a flexible polymer substrate, enables accurate detection of healing-related variations while maintaining comfort and biocompatibility. Fabricated using scalable printing techniques, the sensor demonstrates stable, reversible, and rapid electrochemical responses within the physiological range. This PANI-based system represents a key step toward intelligent, wearable, and non-invasive wound monitoring technologies for personalized management of diabetic wounds.

A19 – Plasma Polymer Film as an Interlayer to Improve Polymer-Metal Composites Disassembly and Recycling Efficiency

Speaker: CULOT Alexandre (UMONS)

Co-authors and additional affiliation info: Alexandre Culot[1], Robin Dantinne[1], Suyog Raut[1], Damien Cossement[2], Jean-Marie Raquez[3], Damien Thiry[1]. / [1] UMONS ChIPS; [2] Materia Nova Research Center; [3] UMONS SMPC

Metal coatings on polymers are widely used in industries such as electronics, packaging and automotive for their conductivity, barrier properties, and aesthetics. While strong adhesion between metal and polymer is typically beneficial, separating these layers is challenging and costly. Their low recyclability often results in the disposal of such waste causing considerable environmental impact. This study explores the use of plasma polymer films (PPF) as intermediate layers between metals and polymers to improve recyclability. The PPF would ensure strong adhesion with the metallic layer while weakening the interface with the polymer when exposed to a stimulus (e.g., heating).

B19 – Valorizing Eggshell Biowaste: $CaCO_3$ Determination via TG and Back Titration for Biomedical Application

Speaker: DE OLIVEIRA PRIMO Julia (Université de Mons - UMONS)

Co-authors and additional affiliation info: Julia de Oliveira Primo, Nayara Balaba, Carla Bittencourt, Chimie des Interactions Plasma-Surface, Université de Mons (UMONS)

Eggshells are a sustainable, calcium-rich biowaste suitable for producing biomedical materials; therefore, their quantification is essential. Thermogravimetric analysis (TG) and back titration were used to quantify $CaCO_3$ in the biowaste; the two methods were evaluated using a commercial $CaCO_3$ standard. TG results indicated a $CaCO_3$ content of 95.54 wt. %, determined by measuring CO_2 weight loss at $690\,^{\circ}\mathrm{C}$. Titration confirmed that the $CaCO_3$ content in eggshell samples is approximately $97\,\%$. The results underscore the reliability of both methods and confirm the high Ca content in eggshells, supporting their potential as a cost-effective source for the synthesis of calcium-based biomaterials.

C19 – Evaluation de l'impact environnemental des procédés de fabrication de produits composite à base des fibres de bananiers

Speaker: DONGMO MOUAFO Dave Sanchez (Université de Mons)

Co-authors and additional affiliation info: Dave Sanchez Mouafo Dongmo[a,b], Lucas Equeter[a], Paul Alain Nanssou Kouteu[b], Martin Ruben Mouangue[c], Pierre Dehombreux[a] / [a] University of Mons, Faculty of

Engineering, Machine Design and Production Engineering, Mons, Belgium; [b] University of Douala, National Higher Polytechnic School of Douala, Laboratory of Chemical Engineering and Industrial Bio-Processes, Douala, Cameroon; [c] University of Douala, National Higher Polytechnic School of Douala, Laboratory of Energy, Douala, Cameroon

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Cette étude propose un cadre d'aide à la décision pour la conception simultanée matériau–procédé de biocomposites renforcés par fibres de pseudo-tronc de bananier en contexte tropical. L'unité fonctionnelle est une boîte alimentaire hémisphérique à fond plat de $160\,\mathrm{g}$, évaluée selon une approche « cradle-to-gate » intégrant transport et transformation. La modélisation repose sur des bilans matière-énergie couplés à une ACV conforme aux normes Organisation internationale de normalisation (ISO 14040/44). Outre le changement climatique, la demande énergétique cumulée est analysée. Une analyse de sensibilité identifie les paramètres critiques et oriente des stratégies de réduction d'impact adaptées aux filières biosourcées émergentes.

A20 – Einstein Telescope Project: Sustainable Valorisation of Excavated Materials

Speaker: FAŸ Ophélie (UMONS)

Co-authors and additional affiliation info: Ophélie Faÿ[1,2,3], Hannes Claes[2], Fanny Descamps[1], Sara Vandycke[1], Ruben Snellings[2]. / [1] UMONS; [2] KULeuven; [3] FNRS

The Einstein Telescope (ET) aims to construct a $30\,\mathrm{km}$ triangular underground gravitational-wave observatory, with Euregion Meuse-Rhine as a candidate site. This study evaluates the suitability of excavated rocks (Famennian–Namurian) for concrete aggregate. Representative sandstones, limestones, dolostones, and siliciclastics were analyzed using geomechanical, petrographic, mineralogical, and EN-standard aggregate tests. Results indicate that mineralogy, grain size, and cementation strongly control both rock geomechanical properties and aggregate performance. These findings include guidance for sustainable reuse of excavated material and inform the design and geotechnical strategy of ET tunnels.

B20 – Graphene Nanoribbon Array as a Template for Hybrid Nanoarchitectures

Speaker: GONZÁLEZ-IZQUIERDO Palmerina (Universidad de Cantabria)

Co-authors and additional affiliation info: P. González-Izquierdo, M. Barquín, I. Hernández Campo, M. N. Sanz-Ortiz, M. de Pedro del Valle, C. Moreno, Universidad de Cantabria

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On-surface synthesis is a bottom-up approach that enables the fabrication of atomically thin, atomically precise materials on metallic surfaces. Graphene nanoribbons (GNRs) can be produced in this way and exhibit electronic properties which are susceptible to be tuned by varying just one atom-width. Extending this control from 1D to 2D remains challenging. Here, we use aligned GNR arrays as a template to position spin-bearing molecules between neighboring ribbons. Thermal activation induces lateral covalent linking, forming GNRs bridged by the magnetic units. Scanning tunnelling microscopy reveals the resulting hybrid structures and their modified electronic states. This work provides a possible strategy to build 2D functionalized hybrid graphene nanoarchitectures.

C20 – Green Synthesis of Silver Nanoparticles Using Plant Extract for Water Disinfection

Speaker: GUALLE Arleth (UMONS)

Co-authors and additional affiliation info: Arleth Gualle[1], Carla Bittencourt[1], Lourdes M. Orejuela-Escobar[2,3]. / [1] Chimie des Interactions Plasma-Surface (ChIPS), Research Institute for Materials Science and Engineering, University of Mons, 7000 Mons, Belgium; [2] Universidad San Francisco de Quito USFQ, Colegio de Ciencias e Ingenierías, Applied Circular Engineering & Simulation Group (GICAS), Chemical Engineering Department, Diego de Robles y Vía Interoceánica, P.O. Box 17-0901, Quito, Ecuador; [3] Geocircular Consulting Group, Tampa, FL 33617, USA

Access to safe water is a critical humanitarian goal, as approximately 2.2 billion people worldwide lack access to drinking water. Nanomaterials offer a promising solution for water disinfection due to their high surface-to-volume ratio and unique physicochemical properties. Green synthesis (GS) of silver nanoparticles (AgNPs) uses plant extracts rich in phytochemicals capable of reducing Ag^{+} to Ag^{0}. In this study, a LED-assisted GS method ($450\,\mathrm{nm}$ to $460\,\mathrm{nm}$) was developed using avocado seed extracts obtained by Soxhlet extraction. SEM analysis confirmed spherical AgNPs with smaller particle size and reduced aggregation in aqueous extracts, highlighting an eco-friendly and cost-effective approach for water treatment applications.

A21 – Synthesis and Characterization of $CoFe_2O_4$/Liquid Crystal Nanocomposites

Speaker: GULZAR Hussain (Poznan University of Technology, Poznan Poland)

Co-authors and additional affiliation info: Gulzar Hussain[1], Eryk Wolarz[1], Mariusz Ślachciński[2]. / [1] Faculty of Materials Engineering and Technical Physics, Poznan University of Technology, Jacka Rychlewskiego 1 St, 61-131 Poznan, Poland; [2] Institute of Chemistry and Technical Electrochemistry, Poznan University of Technology, 4 Berdychowo St., 60-965, Poznan, Poland

Nanocomposites of $CoFe_2O_4$ and $CoFe_2O_4$/3 wt. % LC were synthesized via auto-combustion and ultrasonication methods. X-ray diffraction analysis confirmed crystallization in the $Fd\bar{3}m$ space group. The estimated lattice constants were $8.29\,\text{Å}$ and $8.35\,\text{Å}$, with corresponding crystallite sizes of $19.59\,\mathrm{nm}$ and $14.68\,\mathrm{nm}$. Scanning electron microscopy (SEM) images verified the incorporation of LC within the nanocomposites. Atomic force microscopy (AFM) was used to assess the surface roughness of both $CoFe_2O_4$ and $CoFe_2O_4$/3 wt. % LC nanocomposites. The calculated band gap energies were $2.05\,\mathrm{eV}$ for $CoFe_2O_4$ and $2.37\,\mathrm{eV}$ for $CoFe_2O_4$/3 wt. % LC. These nanocomposites demonstrate potential for application in electro-optic devices.

B21 – Influence du dopage (Ti, Zr, Hf) sur les propriétés structurales et électromécaniques de KNN

Speaker: KACIMI-NACIRI Hicham (UPHF)

Co-authors and additional affiliation info: Hicham Kacimi-Naciri[1,2], Mohamed Rguiti[1], Ahmed Bachar[2], Assia Mabrouk[2], Mohamed Aymen Ben Achour[1], Christian Courtois[1], Yannick Lorgouilloux[1]. / [1] Univ. Polytechnique Hauts-de-France, INSA Hauts-de-France, CERAMATHS, Laboratoire de Matériaux Céramiques et de Mathématiques, F-59313 Valenciennes, France; [2] Laboratoire Génie des Procédés (LGP), Faculté des Sciences, Université Ibnou Zohr, Agadir, Maroc

Les matériaux piézoélectriques sans plomb constituent une alternative aux PZT largement utilisées. Cette étude, basée sur la DFT (Density Functional Theory), analyse les propriétés structurales, électroniques, mécaniques et piézoélectriques de $K_{0.5}Na_{0.5}NbO_3$ pur et dopé par Ti, Zr et Hf. Les résultats montrent que le dopage modifie fortement la structure cristalline, la bande interdite et l'anisotropie mécanique. Zr offre l'amélioration la plus notable avec un coefficient piézoélectrique $d_{33} \approx 118\,\mathrm{pC/N}$ contre $75\,\mathrm{pC/N}$ pour le matériau pur, liée à une hybridation orbitale optimisée. La nature électromécanique de tous les systèmes est préservée, confirmant leur potentiel pour dispositifs piézoélectriques fiables et durables.

C21 – An Investigation into the Development of Formaldehyde-Free Electroless Copper Plating

Speaker: KHALILI Mohammad Reza (UMONS)

Co-authors and additional affiliation info: Mohammad Reza Khalili[a,b], Veronique Vitry[b], Golnaz Taghavi Pourian Azar[a], Thais Tasso Guaraldo[a], Andrew J. Cobley[b] / [a] Functional Materials and Chemistry Group, Centre for Manufacturing and Materials, Coventry University, United Kingdom; [b] Metallurgy Department, Faculty of Engineering, University of Mons, 20, Place du Parc, Mons, Belgium

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Electroless copper plating is widely used in electronics, but its reliance on formaldehyde poses environmental and health concerns. This study systematically evaluates alternative reducing agents, sugars, ascorbic acid, amines, and borane-based compounds against formaldehyde by using cyclic voltammetry on Pd and Cu catalysts. Sugars and diethanolamine show weak thermodynamics and kinetics, and ascorbic acid and xylose degrade under alkaline conditions. In contrast, borane-based agents, especially sodium borohydride, exhibit strong reducing power and favourable oxidation behaviour, making sodium borohydride the most promising formaldehyde-free reducing agent for electroless copper plating.

A22 – Transcending Downcycling: Solid-State Reactive Processing of ABS into Dynamic Reprocessable Networks

Speaker: KHEIRODDIN Roza (UMONS)

Co-authors and additional affiliation info: Roza Kheiroddin, Jean-Marie Raquez, Rosica Mincheva

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Engineering polymers such as ABS are inherently downcycled during conventional recycling, limiting their circular potential. Here, we introduce a solvent-free solid-state upcycling strategy that enables radical-mediated installation of dynamic covalent crosslinking motifs directly within the polymer matrix. Unlike melt processing, this approach minimizes thermal degradation while preserving structural integrity. Spectroscopic and extraction analyses confirm controlled covalent incorporation and network formation. The resulting material exhibits reprocessable, vitrimer-like behavior with tunable viscoelastic dynamics. This work establishes solid-state reactive processing as a scalable and sustainable pathway to transform commodity engineering plastics into high-value functional materials for circular economy applications.

B22 – Investigation of Galvanized Steel Biocorrosion Mechanisms Associated with Sulfate-Reducing Bacteria

Speaker: LEWILLION Estelle (UMONS)

Co-authors and additional affiliation info: Estelle Lewillion[1], Anne-Lise Hantson[2], Fabienne Delaunois[1]. / [1] UMONS, Service de Métallurgie; [2] UMONS, Service de Génie des procédés chimiques et biochimiques

L'acier galvanisé, apprécié pour son coût modéré et sa résistance à la corrosion, est entre autres utilisé dans l'industrie et la plomberie domestique. Bien que sa durée de vie soit théoriquement de 20 à 50 ans, des défaillances prématurées sont observées. Ces altérations excèdent les prédictions issues des seuls mécanismes électrochimiques classiques et sont de plus en plus attribuées à de la biocorrosion impliquant notamment les bactéries sulfato-réductrices (BSR). Le projet BiocorGal vise à approfondir expérimentalement la compréhension des mécanismes de dégradation des oxydes et du zinc métallique de l'acier galvanisé exposé à des environnements hydrauliques contaminés par les BSR.

C22 – Static & Dynamic Analysis of Composite Timber Floor

Speaker: MARY Emilien (Faculté Polytechnique de Mons / Service de Génie Civil & Mécanique des Structures)

Co-authors and additional affiliation info: Emilien Mary

The construction sector, which has a particularly high environmental footprint, is now faced with the need to turn to more sustainable solutions. In this context, timber stands out as a promising bio-based material and a credible alternative to conventional structural materials. However, its low mass results in limited performance in terms of acoustic insulation and vibration behaviour. While adding mass to floors can effectively mitigate these weaknesses, this solution remains structurally passive. This thesis proposes the development of a composite floor combining wood and raw earth with the aim of overcoming these limitations, improve its static and dynamic performances and promote the use of low-carbon materials.

A23 – Ecological Sorbents Based on Biowaste Cork and Natural Deep Eutectic Solvents for Solid Phase Microextraction and Determination of Fragrance Allergens in Disposable Baby Diapers

Speaker: MYSIAK Daria (Poznan University of Technology)

Co-authors and additional affiliation info: Daria Mysiak, Justyna Werner, Julia Płatkiewicz, Agnieszka Zgoła-Grześkowiak, Mariusz Sandomierski, Łukasz Ławniczak, Justyna Płotka-Wasylka

Fragrance allergens represent the second most frequent cause of contact allergies after nickel, highlighting the need for sensitive and environmentally friendly analytical methods for their determination at trace levels. This study reports the development of eco-friendly composite sorbents based on natural deep eutectic solvents and biowaste cork, and their application in thin film solid phase microextraction for the efficient extraction of seven fragrance allergens from disposable baby diapers in artificial urine, followed by HPLC-DAD analysis. The proposed method provides a simple, sensitive, rapid, and sustainable analytical approach fully aligned with the principles of Green Analytical Chemistry.

B23 – Quantification des défauts de pli de surface dans les composites UD-GFRP usinés

Speaker: NUTTE Matthias (UMONS)

Co-authors and additional affiliation info: Matthias Nutte, François Ducobu, Edouard Rivière-Lorphèvre, UMONS

Les stratifiés UD-GFRP, élaborés par infusion de résine avec plis cousus, sont étudiés lors d'opérations de fraisage. Une méthode semi-automatique de traitement d'image permet de quantifier séparément le délaminage et les fibres non coupées en surface. Des essais expérimentaux font varier l'orientation des fibres, l'avance par dent et la stratégie de fraisage (opposition ou avalant). Les résultats montrent une influence majeure de l'orientation et de la stratégie sur la qualité de surface. Le fil de couture favorise l'apparition de défauts, tandis que le fraisage en avalant à faible avance offre les meilleures performances.

C23 – Exploring Nanomechanical Properties of Plasma Electrolytic Oxidation and Sol-Gel Coatings on AA2024 Alloys

Speaker: RAKOTONIRINA José (UPHF)

Co-authors and additional affiliation info: José Rakotonirina, UPHF/UMONS

Plasma Electrolytic Oxidation (PEO) produces oxide surface layers on valves metals providing improved corrosion resistance and mechanical properties. However, PEO layers, characterized by inherent microporosity, pronounced surface roughness and heterogeneous chemical composition with multiple crystalline phases, pose a significant challenge for reliable mechanical assessment at the nanoscale. This study investigates the hardness and reduced Young's modulus of PEO coatings on AA2024 using nanoindentation tests. Additional sol-gel sealing is also investigated to evaluate the evolution of the mechanical properties of the coatings. Variations in mechanical properties are analysed using a multiphysics methodology integrating nanoindentation data, optical imaging, and chemical composition mapping.

A24 – Enabling Light-Driven 3D Control of Nanomotors with Optical Forces

Speaker: SERRERA Guillermo (University of Cantabria)

Co-authors and additional affiliation info: Guillermo Serrera[1], Yoshito Y. Tanaka[2], Pablo Albella[1]. / [1] University of Cantabria; [2] Hokkaido University

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Recent advances in nanophotonics have used scattering forces from plasmonic nanoantennas or dielectric metasurfaces to achieve transverse two-dimensional motion [1–3]. However, controlling longitudinal motion remains challenging. We introduce a nanomotor design enabling both transverse and longitudinal control: optical pulling forces from an azimuthally polarized Bessel beam act on a glass cylinder [4], while asymmetric plasmonic dimers drive lateral motion under plane-wave illumination.

B24 – Green Synthesis of Catalytically Active PGMs-Based Materials Using Plant-Based Bioinspired Systems

Speaker: STACHOWICZ Wiktoria (Poznan University of Technology, Poland)

Co-authors and additional affiliation info: Wiktoria Stachowicz, Martyna Rzelewska-Piekut, Magdalena Regel-Rosocka, Poznan University of Technology, Faculty of Chemical Technology, Institute of Chemical Technology and Engineering, Poland

Bioinspired systems offer a green and sustainable route for the synthesis of catalytically active nanomaterials. This study focuses on the preparation of platinum (Pt), palladium (Pd), and bimetallic Pt/Pd nanoparticles (NPs) using plant-derived stabilizing and reducing agents, such as saponins. The obtained NPs are preliminarily characterized in terms of size and morphology using atomic force microscopy (AFM). Their catalytic performance is evaluated in a model reduction reaction of 4-nitrophenol to 4-aminophenol. Special attention is given to the selection of suitable support materials to enhance catalyst stability, safety, and applicability in the degradation of aqueous environmental pollutants.

C24 – Conception of a Biocoating for Indoor Air Depollution with a Focus on BTEX Compounds and Formaldehyde

Speaker: STIEVENART Thomas (UMONS)

Co-authors and additional affiliation info: T. Stiévenart, M. Olivier, E. Lachery, D. Lahem, A.-L. Hantson

Indoor air quality is increasingly important because VOCs from materials, adhesives, and paints accumulate indoors. This project develops biocoatings with immobilized microorganisms to degrade pollutants, especially BTEX. Fungal strains (*Phanerochaete chrysosporium*, *Pleurotus ostreatus*, *Trametes versicolor*) and bacterial strains (*Pseudomonas putida*, *Rhodococcus rhodochrous*, *Rhodococcus ruber*) were assessed. An HS-GC-MS method was developed to monitor degradation while accommodating fungi- and bacteria-specific sampling constraints. Toluene and *o*-xylene assays showed sustained degradation activity at high concentrations, indicating robustness under indoor-relevant conditions. Formaldehyde degradation was previously demonstrated with the same sol-gel platform, supporting versatility. Ongoing work targets immobilized biocoatings, paint comparisons, mass transfer, and long-term stability.

A25 – Biobased Thermosetting Resins for Sustainable Applications: Yes We CAN

Speaker: VAN RENTERGHEM Louis (Materia Nova)

Co-authors and additional affiliation info: Louis Van Renterghem, Leïla Bonnaud, Materia Nova

The growing demand for high-performance materials for sustainable applications has led to increased interest in thermoset resins due to their excellent performance and due to the possibility to produce them from renewable and bio-based resources. Within this framework, benzoxazine-based resins exhibit strong performance and therefore appear to be promising candidates because they can be synthesized straightforwardly by condensation of a phenolic, aldehyde, and amine compound. The versatility offered by these raw materials enables the production of a wide range of thermosetting resins with tunable properties making them suitable for sustainable applications such as long-lasting coatings and natural fiber-reinforced composite materials.

B25 – Hierarchical Bi@Sb_2WO_6 Microspheres Based Gas Sensor: Efficient Monitoring of CO_2 Gas at Room Temperature

Speaker: ZHENG Zichen (University of Mons)

Co-authors and additional affiliation info: Zichen Zheng[a,b], Kewei Liu[a,c], Yiwen Zhou[a], Zicong Zhang[a], Yongbin Qin[a], Yifan Luo[a], Kaichun Xu[a,d], Liangchao Guo[a], Marc Debliquy[c], Carla Bittencourt[b], Chao Zhang[a] / [a] College of Mechanical Engineering, Yangzhou University, Yangzhou 225127, PR China; [b] Chimie des Interactions Plasma-Surface, Research Institute for Materials Science and Engineering, University of Mons, 20 Place du Parc, 7000 Mons, Belgium; [c] Service de Science des Matériaux, Research Institute for Materials Science and Engineering, Faculté Polytechnique, University of Mons, 7000 Mons, Belgium; [d] ICB UMR 6303, CNRS, Univ. Bourgogne Franche-Comté, UTBM, 90010 Belfort, France

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In the quest for innovative solutions to combat climate change, our research introduces bismuth-doped antimony tungstate (Bi-doped Sb_2WO_6) microspheres synthesized through a cutting-edge hydrothermal approach. These microspheres serve as active layers in gas sensors designed for the detection of carbon dioxide (CO_2), a key greenhouse gas and vital indicator of air quality. The incorporation of bismuth significantly enhanced the gas-sensing performance of the Sb_2WO_6 microspheres, with the $4\,\%$ Bi-doped sensing active layer achieving a remarkable response value of 15 when exposed to $200\,\mathrm{ppm}$ of CO_2, outperforming the undoped Sb_2WO_6.

Santé & Sciences biomédicales – Health and Biomedical Sciences

C25 – Mise en place de l'étape 1 du programme ICOPE en pharmacie : une étude à méthode mixte.

Speaker: BAMPS Julien (UMONS)

Co-authors and additional affiliation info: Julien Bamps (MPharm), Théodora Merenda (PhD), Stéphanie Patris (PhD), Service de Pharmacie Clinique, Faculté de Médecine, Pharmacie et Sciences Biomédicales, UMONS (Belgique)

Cette étude à méthode mixte évaluait la faisabilité de l'implémentation de l'étape 1 du programme ICOPE, dédié au dépistage des déclins des capacités intrinsèques chez les personnes âgées, dans les officines. Quatorze étudiants ont réalisé le dépistage auprès de 45 patients de 65 ans et plus, dont $82\,\%$ présentaient au moins un déclin, avec une moyenne de 1,8 déclins par patient. Des entretiens menés auprès de 12 étudiants ont mis en évidence l'intérêt du dépistage en officine, les bénéfices pour les patients, ainsi que plusieurs barrières organisationnelles. L'étude confirme la faisabilité du dispositif et identifie des pistes d'amélioration.

A26 – Non-Invasive Multimodal Cardiovascular Health Assessment

Speaker: COLLET Antoine (UMONS - ISIA Lab)

Co-authors and additional affiliation info: Antoine Collet (doctorant), Thierry Dutoit (promoteur), Stéphane Carlier (co-promoteur)

This thesis focuses on developing a non-invasive, multimodal approach for assessing cardiovascular health, enabling clinical integration and preventive monitoring. It combines the analysis of endothelial function, an early marker of cardiovascular disease, and the study of cardiac mechanical activity,

allowing extraction of key physiological parameters. The work is part of the European INTERREG project VasculAI, which develops portable devices combining a connected wristband, thermal imaging, and artificial intelligence. By providing clinically validated, user-friendly, and accessible tools, this research aims to improve early detection of cardiovascular risks and support preventive care beyond hospital settings.

B26 – Preclinical Research of New Therapies Against Cutaneous T-Cell Lymphoma

Speaker: CÓRDOVA HERNÁNDEZ Saire Edith (University of Cantabria)

Co-authors and additional affiliation info: Saire Edith Córdova Hernández, Berta Casar Martínez

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Cutaneous T-cell lymphoma (CTCL) is a non-Hodgkin lymphoma with poor prognosis and limited treatments. In this preclinical study, SeAx and MyLa cell lines were used to evaluate mogamulizumab, pembrolizumab, and ruxolitinib as monotherapies and in combination. In vitro assays assessed cell viability, apoptosis, migration, invasion, and spheroid formation. In vivo, a chicken embryo model was employed to analyze tumor growth, metastasis and pERK expression. Combination treatments significantly reduced viability, migration and invasion while enhancing apoptosis compared to monotherapies. Metastatic burden was markedly decreased in vivo. These findings support combined immunotherapy and JAK inhibition as a promising therapeutic strategy for CTCL.

C26 – Production and Functional Testing of Probes Mimicking Human Sperm CRISP1, CRISP2, and TMEM95 for Oocyte Receptor Identification

Speaker: CRUZ SARDÀ Clàudia (UMONS)

Co-authors and additional affiliation info: Clàudia Cruz Sardà, Thibault Massai, Elise Hennebert, Laboratory of Cell Biology, Research Institute for Biosciences, Research Institute for Health Sciences and Technology, University of Mons, 7000 Mons, Belgium

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The sperm proteins CRISP1, CRISP2, and TMEM95 are crucial for human gamete fusion, yet their oocyte interactors remain unidentified. To achieve this goal, we are producing high-avidity pentamerized probes mimicking these three proteins in Expi293F cells in order to assess their ability to bind to oocytes. Moreover, for CRISP2, an in-silico screening of the human oocyte surfaceome previously performed in our lab identified candidate oocyte interactors. To validate these results, HeLa cells expressing these proteins are incubated with the probes and CRISP-derived synthetic peptides and the binding between the probes and the cells is evaluated in immunofluorescence.

A27 – Understanding Sperm Flagellum Assembly Through QRICH2 Interactome Mapping

Speaker: CUCHE Axel (University of Mons (UMONS), Mons, Belgium)

Co-authors and additional affiliation info: Axel Cuche, Clàudia Cruz Sardà, Laura Braeckevelt, Emeline Derycke, Ornella Casalanguida, Elise Hennebert; Biology, University of Mons (UMONS), Mons, Belgium

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Male infertility affects millions of couples worldwide. Among genetic causes, mutations in the QRICH2 gene lead to complete infertility through sperm flagellar defects. Yet, how this protein

orchestrates sperm flagellar assembly remains poorly understood. This study aims to map QRICH2's protein interaction network throughout spermatogenesis and in mature sperm using two complementary approaches: yeast two-hybrid screening and co-immunoprecipitation combined with mass spectrometry. Initial yeast two-hybrid screening identified potential partners involved in flagellar assembly, transcriptional regulation, and post-translational modifications, including testis-enriched proteins.

B27 – Potentiel antivirulent des extraits de *Sclerocarya birrea*, *Ximenia americana* et *Guiera senegalensis*

Speaker: DA Kégour (Université de Mons)

Co-authors and additional affiliation info: Kégour Da[1,2], Julie Carette[1], Moussa Compaoré[2], Christian Emmanuel Mahavy[1], Amandine Nachtergael[1]. / [1] Laboratoire de Chimie Thérapeutique et de Pharmacognosie, Institut de Recherche en Sciences et Technologies de la Santé, Institut de Recherche en Biosciences, Faculté de Médecine, de Pharmacie et des Sciences Biomédicales, Université de Mons (UMONS), Belgique; [2] Laboratoire de Biochimie et Chimie Appliquées (LABIOCA), Unité de Formation et de Recherche en Sciences de la Vie et de la Terre, Université Joseph Ki-Zerbo, 03 BP 7021 Ouagadougou 03, Burkina Faso

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Sclerocarya birrea, *Ximenia americana* et *Guiera senegalensis* sont trois plantes médicinales largement utilisées au Burkina Faso. Le présent travail vise à évaluer le potentiel antivirulent des extraits à l'éther de pétrole et au dichlorométhane des feuilles de *S. birrea*, *X. americana* et *G. senegalensis*. Les effets de ces extraits sur la formation du biofilm, la motilité bactérienne, ainsi que sur la production de pyocyanine et de rhamnolipides ont été évalués. Les résultats montrent que l'extrait à l'éther de pétrole de *S. birrea* présente la meilleure efficacité, avec une inhibition de la production de pyocyanine de $69{,}7\,\% \pm 1{,}38$ et de rhamnolipides de $39{,}13\,\% \pm 1{,}45$.

C27 – Development and characterization of a curcumin nanoemulsion with biological properties for oral administration

Speaker: DE CAMPOS Daniele (UMONS)

Co-authors and additional affiliation info: Daniele de Campos[1], Carla Bittencourt[1,2]. [1]UMONS; [2]Materia Nova

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This study developed a stable curcumin nanoemulsion to overcome low oral bioavailability and solubility. Using the liquid-liquid dispersion method, nanoparticles were synthesized with a mean diameter of $201.4\,\mathrm{nm}$, a polydispersity index of 0.209, and a zeta potential of $-31.3\,\mathrm{mV}$. These parameters remained stable for six months at $25\,^{\circ}\mathrm{C}$ and $8\,^{\circ}\mathrm{C}$. The formulations demonstrated promising mucoadhesive properties for crossing mucosal barriers. Furthermore, the nanoemulsion maintained stable antioxidant activity for $48\,\mathrm{h}$, whereas non-encapsulated compounds lost efficacy rapidly. These results indicate the formulation is a viable nanocarrier for enhancing curcumin's therapeutic delivery.

A28 – Plasma proteome elucidation by mass spectrometry: challenge accepted

Speaker: DEMULIES Lise (UMONS)

Co-authors and additional affiliation info: Lise Demulies[a], Blandine Chazarin[a], Ruddy Wattiez[a]. [a]Proteomic and Microbiology Department, UMONS, Mons, Belgium

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Proteome characterisation by mass spectrometry (MS) of blood-sourced samples as plasma plays a major role in clinical research. Presenting major advantages (non-invasive, large quantity) it remains challenging for analysis due to its large dynamic range of 9 orders of magnitude (difference between lowest and highest concentrations). The different anticoagulants influence the analytical outcome and we aim to focus on heparinised plasma, widely used but not optimal for proteomics. Development at sample preparation, analytical pipeline and bio-informatic data interpretation were compared to increase heparinised plasma proteome elucidation. This work is part of the Syst-Imm FEDER project (FEDER/FSE+/FTJ Regional Program 2021–2027).

B28 – Caractérisation des interactions entre les domaines protéiques de NS1 du virus Influenza A et de la protéine ribosomique uL10

Speaker: FANGUENG NOUMBIAP Chanisse (Laboratoire de Biologie Cellulaire – Université de Mons)

Co-authors and additional affiliation info: Chanisse Fangueng, Florent Malherbe, Vicharnee Phuengpornsawan, Lionel Tafforeau

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Le virus Influenza A détourne la machinerie cellulaire de son hôte afin d'assurer la traduction de ses ARN messagers. La protéine non structurale NS1 joue un rôle central dans ce processus en interagissant notamment avec des protéines impliquées dans le contrôle de la traduction. Mon étude s'intéresse à l'interaction potentielle entre NS1 et la protéine uL10 de la tige P du ribosome, une structure dynamique impliquée dans l'élongation traductionnelle. En combinant des approches de clonage de domaines protéiques et d'analyses d'interactions par GPCA et co-immunoprécipitation, ce projet vise à identifier les régions structurales impliquées dans la liaison de NS1 à uL10.

C28 – Point sur l'omniprésence des perturbateurs endocriniens et leur impact sur notre santé

Speaker: FIÉVET Manon (Université de Mons, Laboratoire d'Histologie)

Co-authors and additional affiliation info: Manon Fiévet[1], Denis Nonclercq[1]. [1]Laboratoire d'Histologie, Institut Santé, Faculté de Médecine, Pharmacie et Sciences biomédicales, Université de Mons

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Au quotidien, nous sommes exposés à un cocktail de substances chimiques d'origine artificielle ou naturelle (phytoœstrogènes) pouvant altérer notre équilibre hormonal. Nos populations sont peu sensibilisées aux perturbateurs endocriniens auxquels nous sommes exposés par voie cutanée, ingestion, inhalation mais aussi via le placenta. La grossesse représente d'ailleurs une période de haute vulnérabilité. Leur omniprésence pourrait expliquer la recrudescence des troubles de la fertilité, du métabolisme et des cancers hormonodépendants. Par des modifications épigénétiques, leurs effets néfastes peuvent même être transmis aux générations futures. Ma thèse a pour objectif d'étudier les effets des perturbateurs endocriniens de type phytoœstrogènes sur notre santé.

A29 – Is succination involved in cardiotoxicity?

Speaker: FIZAZI Afaf (UMONS)

Co-authors and additional affiliation info: Afaf Fizazi[1,2], Cloé Schoeling[1,2], Anne-Émilie Declèves[2], Jean-Marie Colet[1]. [1]Human Biology and Toxicology Laboratory; [2]Metabolic and Molecular Biochemistry Laboratory

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SUMO1 is responsible for SUMOylating SERCA2a, which is responsible for the reuptake of Ca^{2+} in the endoplasmic reticulum. This study aims to investigate if succination, an irreversible post-translational modification, is responsible for influencing the function of SUMO1. Such modifications may affect the function of SERCA2a. To explore this, we enrich AC16 cardiomyocytes with disodium fumarate to increase the intracellular fumarate levels. This approach allows the evaluation of the succinated SUMO1 and its function in SUMOylating SERCA2a. Evaluation includes a combination of metabolomic analysis, calcium level measurement, and protein assessment techniques.

B29 – Fertility control in bacteria: Natural mechanisms that block gene exchange | Contrôle de la fertilité chez les bactéries : des mécanismes naturels qui bloquent l'échange génétique

Speaker: GARCIA-LOPEZ Daniel (Instituto de Biomedicina y Biotecnología de Cantabria, Universidad de Cantabria)

Co-authors and additional affiliation info: Daniel García-López[1], Sheila González-Gutiérrez[1], Fernando de la Cruz[1], Eric Cascales[2], M. Pilar Garcillán-Barcia[1]. [1]Instituto de Biomedicina y Biotecnología de Cantabria (CSIC-UC), Santander, Spain; [2]Laboratoire d'Ingénierie des Systèmes Macromoléculaires (IMM, AMU-CNRS), Marseille, France

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Imagine if bacteria had "fertility control": while humans use methods to prevent unwanted pregnancies, bacteria also have ways to stop the spread of genetic material. Bacteria exchange genes through plasmids—small DNA molecules that move between cells and spread traits like antimicrobial resistance, making infections harder to treat and fuelling a global health crisis. We study natural "fertility inhibition" systems that block this genetic transfer. Using bioinformatics, we have identified new inhibition factors and validated their activity experimentally. Understanding how bacteria naturally control gene exchange may inspire innovative strategies to slow the spread of antibiotic resistance.

C29 – Perception of Traditional Medicine Centers (TMC) among Traditional Health Practitioners (THPs) in the Nakambé region (Burkina Faso): a quantitative analysis

Speaker: GNISSIEN Djeneba (UMONS)

Co-authors and additional affiliation info: Djeneba Gnissien[1,3], Blaise Bourgou[1,3], Moussa Compaore[1], Martin Kiendrebeogo[1], Pierre Duez[3], Noufou Ouédraogo[2], Amandine Nachtergael[3]. [1]Laboratory of Biochemistry and Applied Chemistry (LABIOCA), Doctoral School of Science and Technology (ED/ST), Joseph Ki-Zerbo University, 03 BP 7021, Ouagadougou, Burkina Faso; [2]Laboratory for Research and Development of Phytomedicines and Medicines (LR-D/PM), Institute for Health Sciences Research (IRSS)/CNRST, 03 BP 7047, Ouagadougou, Burkina Faso; [3]Unit of Therapeutic Chemistry and Pharmacognosy (CTP), University of Mons (UMONS), Mons, 25 BP 7000, Belgium

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To facilitate the integration of traditional medicine, Traditional Medicine Centers (TMC) have been built but remain non-operational. The objective of this study is to evaluate the perception of the TMC

by Traditional Health Practitioners (THPs). Semi-structured interviews were conducted with THPs from June 24, 2024, to July 24, 2024, in the Nakambé region. A total of 355 THPs were interviewed, with a predominance of men (69.6 %). Naturotherapists were the most represented (63.1 %). Most THPs work in collaboration with conventional health workers. 87.2 % have already referred patients to hospital and 87.0 % are willing to practise in a TMC.

A30 – Cancer-related cognitive impairment: mechanisms and clinical implications

Speaker: HENRIETTE Léa (UMONS)

Co-authors and additional affiliation info: Léa Henriette[1], Vincent Richard[1], Giovanni Briganti[1]. [1]Department of Computational Medicine and Neuropsychiatry, University of Mons, Belgium

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Cancer-Related Cognitive Impairment (CRCI) is a consequence of cancer and its treatments, affecting a substantial proportion of the growing survivor population. CRCI encompasses deficits in cognitive functioning, with prevalence estimates ranging from 23 % to 44 %. Beyond its neurobiological underpinnings, CRCI carries clinical and psychosocial consequences. Cognitive difficulties co-occur with anxiety, depression, and fatigue, forming a cluster of "invisible" symptoms that profoundly disrupts survivors' daily functioning. Return to work is often delayed or compromised, and the erosion of cognitive abilities contributes to diminished quality of life, loss of occupational identity, and increased psychological distress.

B30 – Étude des effets de coumarines issues de *Ruta graveolens* sur la fonction spermatique : une approche pour la contraception masculine

Speaker: JAMAL ABDEL Kader (UMONS)

Co-authors and additional affiliation info: Kader Jamal Abdel[1], Vanessa Arcolia[2], Jean-François Simon[2], Amandine Nachtergael[3], Elise Hennebert[1]. [1]Laboratoire de Biologie Cellulaire, Institut de recherche en Biosciences, Institut de recherche en Sciences et Technologies de la Santé, Université de Mons, 7000 Mons, Belgique; [2]Clinique de Fertilité, CHU Helora – site Kennedy, 7000 Mons, Belgique; [3]Laboratoire de Chimie thérapeutique et Pharmacognosie, Institut de recherche en Sciences et Technologies de la Santé, Institut de recherche en Biosciences, Université de Mons, 7000 Mons, Belgique

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À l'heure actuelle, la contraception repose presque exclusivement sur les femmes. En effet, alors qu'une grande variété de moyens contraceptifs leur est proposée, chez l'homme, les méthodes se limitent aux préservatifs et à la vasectomie. Ce projet s'intéresse à certaines coumarines extraites de *Ruta graveolens*, une plante utilisée en médecine traditionnelle, pour laquelle des effets secondaires contraceptifs masculins ont été rapportés. L'impact de ces coumarines sur la fonction spermatique est évalué afin d'identifier une molécule capable d'inhiber cette fonction et de constituer une piste pour le développement d'une contraception masculine.

C30 – Targeting thyroid hormone receptor alpha with natural polyphenols: a novel strategy for NAFLD modulation

Speaker: KONSTANTINOU Evangelia K. (Department of Nutritional Science and Dietetics, School of Health Sciences, University of the Peloponnese, Antikalamos, 24100 Kalamata, Greece)

Co-authors and additional affiliation info: Evangelia K. Konstantinou, Maria Dimitriou

Non-alcoholic fatty liver disease (NAFLD) is a metabolic syndrome caused by triglyceride accumulation in hepatocytes, primarily due to insulin resistance and obesity. It is the most common chronic liver disease globally, affecting $55.4\,\%$ of the population by 2040. NAFLD develops into two pathological conditions: Non-Alcoholic Fatty Liver (NAFL) and Non-Alcoholic Steatohepatitis (NASH), which can lead to cirrhosis and liver cancer. THRA, a nuclear receptor, plays a crucial role in mediating thyroid hormone metabolism, affecting lipid and glucose metabolism, obesity, and diabetes. As a possible treatment, this *in silico* study examines the binding interactions between THRA and polyphenols and flavonoids.

A31 – Impact de l'infection par le virus Influenza A sur l'ubiquitine ligase ZNF598

Speaker: LABIE Laura (Université de Mons)

Co-authors and additional affiliation info: Laura Labie, Théo Massart, Lionel Tafforeau

La protéine à doigt de zinc ZNF598 est une E3 ubiquitine-ligase jouant un rôle crucial dans la voie de contrôle qualité associée aux ribosomes et dans la régulation négative de la réponse immunitaire innée. Le virus Influenza A (IAV), à l'origine des épidémies saisonnières de grippe, exploite des mécanismes médiés par l'ubiquitine au cours de son cycle infectieux afin d'établir une infection efficace. Sur la base de résultats suggérant une implication de ZNF598 dans l'infection par IAV, nous avons analysé l'impact de l'infection sur la localisation subcellulaire et l'abondance protéique de ZNF598.

B31 – Development and evaluation of the radiosensitizing potential of platinum-functionalized iron oxide nanoparticles

Speaker: LECOMTE Valentin (UMONS)

Co-authors and additional affiliation info: V. Lecomte[1,*], I. Ternad[1], V. Harmegnies[1], E. Beauchot[1], C. Stassin[1], D. Stanicki[1], T. Vangijzegem[1], S. Boutry[2], R.N. Muller[1,2], S. Laurent[1,2]. [1]General, Organic and Biomedical Chemistry Unit, NMR and Molecular Imaging Laboratory, University of Mons (UMONS); [2]Center for Microscopy and Molecular Imaging (CMMI), Gosselies, Belgium

This study presents IONPs@Pt(II), iron oxide nanoparticles enriched with a platinum complex to optimize radiotherapy. Acting as theranostic agents (useful for MRI/MPI imaging and treatment), these particles release platinum in the lysosomal environment, promoting the formation of DNA adducts. Tested on A549 cancer cells, they significantly increase radiosensitization compared to conventional IONPs. This synergy enhances the effectiveness of irradiation *in vitro*, marking a promising step towards *in vivo* trials to validate this therapeutic potential.

C31 – Development of silica nanoparticles combining quantitative ^{19}F MRI and boron neutron capture therapy (BNCT)

Speaker: MAES Amandine (Université de Mons (UMONS))

Co-authors and additional affiliation info: Amandine Maes[1], Thomas Vangijzegem[1], Géraldine Descamps[1], Sébastien Boutry[2], Robert N. Muller[1,2], Dimitri Stanicki[1], Sophie Laurent[1,2]. [1]General, Organic and Biomedical Chemistry Unit, NMR and Molecular Imaging Laboratory, University of Mons (UMONS), Mons, Belgium; [2]Center for Microscopy and Molecular Imaging (CMMI), Gosselies, Belgium

Mesoporous silica nanoparticles (NPs) were developed as a theranostic platform for melanoma, combining boron neutron capture therapy (BNCT) and quantitative ^{19}F MRI. Core-shell NPs encapsulate perfluoro-15-crown-5-ether and are functionalized with borocaptate (BSH) co-grafted with PEG chains to ensure their colloidal stability. Comprehensive physicochemical characterization confirmed size homogeneity, surface functionality, and reproducible B/F ratios. *In vitro* assays on melanoma and fibroblast cell lines indicated low toxicity. Future studies will investigate nanoparticle uptake and accumulation in 2D and 3D melanoma models, followed by *in vitro* neutron irradiation and *in vivo* biodistribution, to validate the therapeutic potential of this platform.

A32 – ZNF598 : une nouvelle cible de la protéine NS1 d'Influenza A dans la régulation de RIG-I ?

Speaker: MASSART Théo (UMONS)

Co-authors and additional affiliation info: Théo Massart, Melissa Havuz, Justine Petit, Samantha Chouela, Lionel Tafforeau

Le virus Influenza A (IAV) est un agent infectieux responsable des épidémies saisonnières de grippe. Principalement via sa protéine virale NS1, l'IAV détourne des mécanismes liés à la réponse immunitaire innée pour favoriser son cycle infectieux. ZNF598 est une E3 ubiquitine-ligase qui réprime indirectement l'expression des interférons en délivrant l'ubiquitine D (FAT10) sur le senseur cytosolique d'ARN viral RIG-I. Cette modification inhibe l'activation de RIG-I et par conséquent atténue la réponse antivirale. Dans cette étude, nous avons caractérisé l'interaction entre ZNF598 et NS1, et étudié son impact sur la FATylation de RIG-I.

B32 – Aristolochiaceae of the Democratic Republic of Congo. Microscopic and HPTLC phytochemical fingerprinting of species used in traditional medicine

Speaker: MOKE MUINDU Papy (University of Mons)

Co-authors and additional affiliation info: Papy M. Moke[a,b,*], Salvius A. Bakari[a], Cedric S. Mutombo[a], Pierre Duez[b], Kahumba Byanga[a], Amandine Nachtergael[b]. [a]Pharmacognosy Laboratory, Department of Pharmacology, Faculty of Pharmaceutical Sciences, University of Lubumbashi, Lubumbashi, DR Congo; [b]Laboratory of Therapeutic Chemistry and Pharmacognosy, Research Institute for Health Sciences and Technology, Research Institute for Bioscience, Faculty of Medicine, Pharmacy and Biomedical Sciences, University of Mons (UMONS), Belgium

This study aims to identify species belonging to the Aristolochiaceae family present in DR Congo and those used in traditional medicine for further botanical description and HPTLC identification of aristolochic acids. An inventory of Aristolochiaceae in the DR of Congo was compiled from various databases (POWO, GBIF, iNaturalist), and a bibliographic search of Aristolochiaceae used in traditional medicine. Microscopic and HPTLC analyses were performed. Six species have been recorded, one of which, *Aristolochia heppii* Merxm., is used in traditional medicine. Aristolochic acids I and II were identified by HPTLC in methanolic extract. It is highly likely that users of traditional recipes based on this species are exposed to the risk of intoxication.

C32 – Translational development of targeted iron oxide nanoplatforms for ferroptosis-mediated radiosensitization in glioblastoma

Speaker: RASSON Olivia (UMONS)

Co-authors and additional affiliation info: Olivia Rasson[1], Teriiroa Liant[4], Dorianne Sant'Angelo[1], Serge Ndam[3], Sophie Laurent[2], Fabrice Journe[1]. [1]Department of Human Biology and Toxicology (Cancer Research Unit), Faculty of Medicine, University of Mons (UMONS), Mons, Belgium; [2]Department of General, Organic and Biomedical Chemistry, NMR and Molecular Imaging Laboratory, University of Mons (UMONS), Mons, Belgium; [3]Department of Radiotherapy, EpiCURA, Baudour, Belgium; [4]Department of Medical Physics, EpiCURA, Baudour, Belgium

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Glioblastoma (GBM) is the most aggressive primary brain tumour in adults and remains largely incurable due to diffuse infiltration, molecular heterogeneity, and resistance to radiotherapy. Hypoxia and strong antioxidant defences limit radiation-induced oxidative damage, highlighting the need for innovative radiosensitization strategies. This project aims to develop targeted iron oxide nanoparticles (IONP) to enhance GBM radiosensitivity by inducing ferroptosis, an iron-dependent form of cell death driven by lipid peroxidation. IONPs will be combined with ferroptosis inducers (erastin, RSL3) and targeted to tumour cells. Efficacy and mechanisms will be evaluated in GBM cell lines, 3D spheroids, patient-derived organoids, and orthotopic mouse models.

A33 – Targeted drug delivery from the surface of polymeric biomaterials

Speaker: RECZKOWSKI Jakub (Poznan University of Technology)

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The use of polymeric biomaterials in implantology is a rapidly developing field focused on achieving safe integration of biomaterials with the body. Despite technological advances, infections and inflammatory complications remain major challenges in their use. Thus, systemic drug administration is often insufficient, and increasing emphasis is placed on local drug delivery from implant surfaces, enabling high concentrations of active agents at the target site with minimal systemic side effects. Surface modifications of biomaterials, such as functional coatings, can further improve their properties. These strategies are particularly relevant in orthopedics and reconstructive surgery, supporting improved implant-tissue integration and therapeutic outcomes.

B33 – Remèdes oubliés, savoirs retrouvés : exploration de livres européens anciens pour identifier des plantes médicinales candidates pour les maladies métaboliques

Speaker: Audrey Roman (Université de Mons (UMONS))

Co-authors and additional affiliation info: ROMAN Audrey[1], Cyntia Kueteda Kana[1], Anne-Emilie Decleves[2], Amandine Nachtergael[1]. / [1]Laboratoire de Chimie thérapeutique et Pharmacognosie, UMONS; [2]Laboratoire de Biochimie métabolique et moléculaire, UMONS

Nous avons analysé cinq ouvrages médicaux européens de la période moderne (env. 1450–1800) et de la période contemporaine (après 1800) afin d'identifier des plantes traditionnellement utilisées contre des troubles métaboliques (affections hépatiques, diabète, obésité). Les plantes, citées

sous noms vernaculaires et/ou appellations botaniques anciennes, ont été harmonisées et vérifiées via l'International Plant Names Index (IPNI). Quatre espèces reviennent de façon récurrente — *Agrimonia eupatoria*, *Chelidonium majus*, *Geum urbanum*, *Alchemilla vulgaris* — mais restent peu étudiées pour ces indications. Nous testerons par la suite leurs extraits *in vitro* sur cellules hépatiques en conditions lipotoxiques, avec un focus sur la MASLD.

C33 – Extracellular vesicles and genetic risk as biomarkers for clinical stratification in autism spectrum disorder

Speaker: SALAS RAD Sara (EDUC, IDIVAL, Ui1)

Co-authors and additional affiliation info: Sara Salas Rad[1,2,3], Javier Vázquez Bourgon[4,2,1,5], María Juncal Ruiz[6,2,1]. / [1]University of Cantabria, Santander, Spain; [2]IDIVAL; [3]Universidad Isabel I (Ui1); [4]Department of Psychiatry, Marqués de Valdecilla University Hospital, Santander, Spain; [5]Biomedical Research Center in Mental Health Network (CIBERSAM), Health Institute Carlos III, Madrid, Spain; [6]Department of Psychiatry (Child and Adolescent Mental Health Unit), Sierrallana Hospital, Torrelavega, Spain

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Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by marked clinical heterogeneity and limited tools for early diagnosis and stratification. This PhD project aims to identify biological markers associated with ASD severity to improve early detection and clinical characterization. A case–control study will include 100 children and adolescents with ASD and 100 age- and sex-matched healthy controls. Serum extracellular vesicles and their molecular content will be analysed, and standardized clinical assessments will measure symptom severity. Associations between biological markers and clinical profiles will be explored to identify meaningful subgroups supporting earlier and more personalized interventions.

A34 – Assessment of the combination of iron oxide nanoparticles and erastin to radiosensitize head and neck cancer cells

Speaker: SANT'ANGELO Dorianne (UMONS, Laboratoire de Biologie Humaine et Toxicologie)

Co-authors and additional affiliation info: Dorianne Sant'Angelo[1], Faustine Bouffioux[1], Noémie Jockin[1], Géraldine Descamps[2], Valentin Lecomte[2], Dimitri Stanicki[2], Laurine Verset[3], Sven Saussez[4], Sophie Laurent[2], Fabrice Journe[1]. / [1]Department of Human Biology and Toxicology (Cancer Research Unit), Faculty of Medicine, University of Mons (UMONS), 7000 Mons, Belgium; [2]Department of General, Organic and Biomedical Chemistry, NMR and Molecular Imaging Laboratory, University of Mons (UMONS), 7000 Mons, Belgium; [3]Department of Pathology, Institute Jules Bordet, HUB, Université Libre de Bruxelles (ULB), 1070 Brussels, Belgium; [4]Department of Anatomy, Faculty of Medicine, University of Mons (UMONS), 7000 Mons, Belgium

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Head and neck cancers (HNC) rank as the seventh most common malignancy worldwide, with radiochemotherapy remaining the standard treatment for locally advanced stages. This study evaluated TEPSA-coated iron oxide nanoparticles (IONPs) as potential radiosensitizers, alone or combined with the ferroptosis inducer erastin on HNC cell lines. While IONPs were efficiently internalized, they did not significantly enhance radiosensitivity despite reduced thioredoxin reductase activity. Erastin decreased cell viability and glutathione levels but did not potentiate radiation effects. However, the combined treatment of IONPs and erastin reduced cell viability and clonogenic survival, suggesting a promising strategy warranting further investigation, particularly regarding ferroptosis-mediated mechanisms.

B34 – Criblage biologique et phytochimique de quelques plantes médicinales de l'Arc cuprifère katangais utilisées en médecine traditionnelle contre le cancer et les pathologies y apparentées.

Speaker: SUMBU NZUKI Trésor (UMONS)

Co-authors and additional affiliation info: Sumbu Nzuki Trésor[1,2,3,*], Bakari Amuri Salvius[1], Amandine Nachtergael[2], Denis Nonclercq[5], Pierre Duez[2], Fabrice Journée[3,4], Kahumba Byanga Joh[1]. / [1] Laboratoire de Pharmacognosie, Faculté des Sciences Pharmaceutiques, Université de Lubumbashi (UNILU), B.P. 1825, Lubumbashi, République Démocratique du Congo; [2] Unité de Chimie Thérapeutique et de Pharmacognosie, Faculté de Médecine et de Pharmacie, Université de Mons (UMONS), 7000 Mons, Belgique; [3] Laboratoire de Biologie Humaine et Toxicologie, Faculté de Médecine et de Pharmacie, Université de Mons (UMONS), 7000 Mons, Belgique; [4] Laboratoire d'oncologie clinique et expérimentale, HUB-Institut Jules Bordet, Université libre de Bruxelles, 1000 Bruxelles, Belgique; [5] Laboratory of Histology, Research Institute of Biosciences, University of Mons, Mons, Belgium

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La chimiothérapie est l'un de principal traitement anticancéreux dont certains médicaments sont issus de substances naturelles. L'objectif de cette étude est de découvrir les nouveaux traitements contre le cancer à partir de plantes médicinales utilisées en RDC.La cytotoxicité a été réalisée à l'aide de tests Crystal violet et MTT contre les lignées du mélanome (MM074), du cancer tète et cou (FaDu) et celui du sein triple négatif (MDA-MB-231). Sur vingt-quatre extraits testés, cinq étaient intéressants, avec des CI_{50} inférieures à $50\,\mu g\,mL^{-1}$. Suivant les résultats obtenus, ces plantes médicinales contiendraient des substances naturelles pouvant conduire aux nouveaux médicaments anticancéreux.

C34 – Structural inequalities in health across sub-Saharan Africa: A machine learning exploration of underlying determinants

Speaker: TEJERÍA-MARTÍNEZ Mercedes (Universidad de Cantabria)

Co-authors and additional affiliation info: Mercedes Tejería-Matínez, Vanesa Jordá & José María Sarabia / Universidad de Cantabria

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This study examines health inequality across 10 Sub-Saharan African countries using Body Mass Index data from Demographic and Health Surveys. Employing conditional inference trees, it classifies populations by socioeconomic, demographic, and lifestyle factors. Results reveal significant disparities, especially in Mauritania, Eswatini, and Kenya, with Egypt being the most equal. Inequalities are primarily driven by illegitimate factors like wealth and education rather than personal choices. Age and gender emerge as major contributors to health disparities. The findings call for targeted policies addressing structural barriers, expanding healthcare access, strengthening social protection, and promoting gender equality to achieve health equity across the region.

A35 – Identification des informations nécessaires aux professionnels médico-psycho-sociaux pour renforcer la transition hôpital-domicile : une étude qualitative

Speaker: VERMAUT Valentine (UMONS)

Co-authors and additional affiliation info: Valentine Vermaut[1,2], Dina Maamar[1], Antonelle Pardo[1,2], Stéphanie Patris[1]. / [1] UMONS; [2] CHR Haute Senne

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Le retour à domicile après un passage à l'hôpital représente une période critique due à la fragmentation des soins. Une coordination entre le milieu hospitalier et ambulatoire permet d'assurer la continuité et la sécurité des soins. Cette étude qualitative visait à identifier les informations dont les professionnels médico-psycho-sociaux ont besoin pour garantir des soins optimaux aux patients. Des entretiens semi-directifs ont été réalisés avec des professionnels travaillant (1) en ambulatoire et (2) à l'hôpital. Une analyse thématique a mis en évidence les informations indispensables à transmettre entre les deux lieux de soins ainsi que les outils de communication privilégiés.

B35 – Potentiel antibiofilm et antivirulence d'extraits de fruits de Spondias dulcis contre Pseudomonas aeruginosa PAO1 : étude préliminaire

Speaker: ZATOVONIRINA Mirana Bodomalala (Université de Mons)

Co-authors and additional affiliation info: M. B. Zatovonirina[a,b], C. E. Mahavy[a], P. Duez[b], M. El Jaziri[c], A. Nachtergael[b], T. Rasamiravaka[a] / [a] UA – Laboratoire de Biotechnologie – Microbiologie, Université d'Antananarivo, Madagascar; [b] UMONS – Laboratoire de Chimie Thérapeutique et de Pharmacognosie, Université de Mons, Belgique; [c] ULB – Laboratoire de Biotechnologie Végétale, Université Libre de Bruxelles, Belgique

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Les infections bactériennes associées aux biofilms représentent un défi majeur en médecine moderne en raison de leur tolérance aux antibiotiques. Cette étude préliminaire évalue le potentiel antibiofilm et antivirulence d'extraits de fruits de Spondias dulcis contre Pseudomonas aeruginosa PAO1. A une concentration sub-inhibitrice de $100\,\mu g\,mL^{-1}$, les extraits heptane et acétate d'éthyle réduisent significativement la biomasse de biofilms de $24\,h$. Ils inhibent également la motilité de type twitching et la production de pyocyanine. Ces résultats suggèrent que Spondias dulcis constitue une source prometteuse de composés naturels capables de moduler la virulence bactérienne chez des pathogènes opportunistes cliniques.

Sciences du vivant & Environnement – Life Sciences & Environment

C35 – Étude de l'hétérogénéité d'une contamination PFAS sur un site de captage d'eau souterraine à Nimy dans l'aquifère crayeux du bassin de Mons

Speaker: COGLIANDRO Fabio (UMONS - Service de géologie fondamentale et appliquée)

Co-authors and additional affiliation info: Fabio COGLIANDRO[1], Anthony MAHIEU[1], Guillaume DE SCHEPPER[2], Tanguy ROBERT[2], Pascal GODERNIAUX[1]. / [1] Université de Mons – Polytech Mons – Géologie et Géologie Appliquée, Mons, Belgique; [2] VIVAQUA – Département Production – Gestion des Ressources en Eau, Bruxelles, Belgique

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Ce travail analyse la distribution des PFAS dans les captages de Nimy, au sein de l'aquifère crayeux du bassin de Mons. Suite à une contamination du site, une barrière hydraulique a été instaurée en 2023. L'étude mobilise un suivi hydrochimique, des analyses statistiques (PCA, t-SNE) et une modélisation numérique du transport des solutés.Les résultats révèlent une prédominance de PFAS à chaîne courte à l'est du site et de PFOS au nord, liés à des influences urbaines, industrielles et agricoles. Enfin, les simulations valident l'efficacité des configurations de la barrière hydraulique pour limiter la migration des polluants selon leur origine.

A36 – Design of continuous-flow systems for microplastic magnetization and recovery

Speaker: DÍAZ Marta (Universidad de Cantabria)

Co-authors and additional affiliation info: M. Díaz-Rivas, C. González-Fernández, M. J. Rivero, I. Ortiz, E. Bringas / Departamento de Ingenierías Química y Biomolecular, Universidad de Cantabria

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This work provides a novel contribution to the design of continuous-flow magnetic systems for microplastics recovery from water. These systems comprise two steps: (i) microplastic magnetization due to the adhesion of magnetic nanoparticles to their surface and (ii) magnetic recovery of the magnetized microplastics. Different curved geometries for the magnetization stage are evaluated to assess their performance in promoting magnetic nanoparticle-microplastic contact. The results provide understanding of the governing transport and fluid dynamic phenomena within these systems. Hence, the insights gained from this study can be valuable for the rational design and optimization of continuous-flow magnetization systems for microplastic retrieval.

B36 – Elementary, My Dear Researcher: Using Trophic Connectivity to Investigate Ecosystem Resilience

Speaker: DÍEZ-MUÑOZ María (Oceanographic Center of Santander, Spanish Institute of Oceanography (CSIC))

Co-authors and additional affiliation info: María Díez-Muñoz[1], Lucía López-López[1], Jose Manuel Hidalgo[2]. / [1] Oceanographic Centre of Santander, Spanish Institute of Oceanography, Santander, Spain; [2] Oceanographic Centre of Balearic Islands, Spanish Institute of Oceanography, Palma de Mallorca, Spain

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Trophic connectivity is fundamental for assessing ecosystem resilience and stability. This study analyses the structure of local food webs across the Iberian Peninsula, focusing on top predators to evaluate potential impacts from environmental stressors. By integrating species presence/absence data with a literature based metaweb, we characterize local interactions using graph theory. This approach quantifies resilience metrics essential for understanding community dynamics. Ultimately, the findings provide a robust framework for informed decision-making in marine conservation strategies.

C36 – Echoes in Animal Remains: Reconstructing Past Ecosystems Through aDNA and Stable Isotopes

Speaker: IBÁÑEZ-HERRANZ Miriam (Universidad de Cantabria)

Co-authors and additional affiliation info: Miriam Ibáñez-Herranz[1,2,*], Ana B. Marín-Arroyo[1], Raúl Fernandéz-López[2]. / [1] Grupo I+D+i EvoAdapta (Evolución Humana y Adaptaciones durante la Prehistoria), Departamento Ciencias Históricas, Universidad de Cantabria, Santander, Spain; [2] Instituto de Biomedicina y Biotecnología de Cantabria, Consejo Superior de Investigaciones Científicas, Santander, Spain; [*] corresponding author

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Understanding past ecosystems requires exploring not only the organisms that inhabited them, but also the relationships between species and their habitats. We present a multidisciplinary approach combining deuterium (δ^2H) analysis of animal bone collagen and ancient DNA (aDNA) recovered from herbivore dental calculus. δ^2H values provide insights into past local temperature and precipitation, while metagenomic analyses of dental calculus allows us to identify the plants consumed by the

animal. Altogether, these approaches offer us a unique window into diet, interspecific interactions, and environmental context. Focusing on herbivore remains associated with Paleolithic human groups, this integrated approach highlights the potential of animal remains to reconstruct ecosystem dynamics and human–environment interactions.

A37 – Comparison of the biodegradation of plasma pre-treated films by a fungal consortium, with and without black liquor

Speaker: JOIE Marie (UMONS)

Co-authors and additional affiliation info: JOIE Marie, DELACUVELLERIE Alice, HERBIN Morgane, RAQUEZ Jean-Marie, WATTIEZ Ruddy / UMONS et MateriaNova

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Inert polymers like low-density polyethylene (LDPE) are not easily biodegradable as they are only composed of carbon and hydrogen. We demonstrated that plasma torch treatment modifies LDPE surface, decreasing hydrophobicity, modifying roughness pattern and adding oxygen groups to the surface, thus promoting fungal colonization. Lignin can increase fungal growth as it's a natural carbon source for some fungi. Here, we compare 3-month-long biodegradation tests, with and without black liquor (that contains lignin). We analyzed and compared polymer characteristics and enzymatic activities, which are modified by the presence of black liquor, and the impact on biodegradation of plasma-treated LDPE films.

B37 – Sustainable treatment of industrial wastewater by adsorption using forest byproducts: A circular economy approach

Speaker: MACENA Morgana Weber (Polytechnic University of Viseu)

Co-authors and additional affiliation info: Morgana Macena[1,2], Helena Pereira[1], Luísa Cruz-Lopes[2], Bruno Esteves[2], Lucas Grosche[3]. / [1] CEF-Forest Research Centre, Associate Laboratory TERRA, School of Agriculture, University of Lisbon, 1349-017 Lisboa, Portugal; [2] CERNAS-IPV Research Centre, Polytechnic University of Viseu, Campus Politécnico, Repeses, 3504-510 Viseu, Portugal; [3] 4iTec Lusitânia S.A., Lugar do Pombal, Zona Industrial do Salgueiro, 3530-259 Mangualde, Portugal

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Adsorption has become a widely applied treatment method for the removal of contaminants from water and wastewater. A promising approach involves the use of residual biomass generated from forest management activities, such as pruning and thinning, as low-cost adsorbents for toxic metals. The main objective of this study is to develop a more sustainable and cost-effective treatment strategy for wastewater generated by the automotive industry, with a particular focus on the removal of zinc ions (Zn^{2+}). At the same time, this approach promotes the valorization of forest residues as adsorbent materials, contributing to resource efficiency and supporting circular economy principles.

C37 – Genomics and proteomics of metalloresistant bacterial endophytes isolated from metallophytes

Speaker: MARCQ Maxime (UMONS)

Co-authors and additional affiliation info: Laboratory of Proteomics and Microbiology, Research Institute for Biosciences, University of Mons, Belgium

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Bacterial endophytes may be found in various plant tissues, such as roots. In metallophytes, plants able to grow in metal-contaminated soils, bacterial endophytes are themselves metal-resistant. Some of them could increase plant biomass, improving phytoextraction. However, the metal resistance systems expressed by these bacteria in planta are poorly studied, due to the low proportion of bacteria in plant tissues. The present research aims to study bacterial endophytes on their metal resistance, to further study the regulation of these system expressions in plants. Understanding plant-bacteria relationships will inform the use of these symbiotic associations, with applicability to phytoremediation.

A38 – Agricultural Systems in Mountain Territories: A Systematic Review with implications for Xerês-Gerês Areas

Speaker: MOREIRA COELHO Sandra (University of Santiago de Compostela)

Co-authors and additional affiliation info: COELHO, SANDRA MOREIRA[1,3], DIAZ-VARELA, EMILIO[1], COSTA, CRISTINA AMARO[2]. / [1] Department of Plant and Engineering Projects, University of Santiago de Compostela, 27002 Lugo, Spain; [2] CERNAS-IPV-Research Centre for Natural Resources, Environment and Society, Higher School of Agriculture | Polytechnic Institute of Viseu, 3500-606, Viseu, Portugal; [3] COMPASSES Research Group, Institute for Global Health and Sustainable Development (iTERRA) – Campus Terra - University of Santiago de Compostela, 27002 – Lugo (Spain)

Mountain agricultural systems are essential for sustaining traditional practices, managing rural landscapes, safeguarding livelihoods, and strengthening the resilience of rural families. However, these territories suffer significant changes, affecting food production, landscape conservation, natural resource use, and biodiversity protection. In this context, we assess how different farming systems contribute to sustainable rural development in these territories.The systematic review underscores the need to examine the factors shaping farms across multiple scales, especially their socio-economic interactions and alignment with local communities priorities. It highlights that autochthonous breeds, extensive livestock and agro-silvo-pastoral systems, and diversified production grounded in agroecological practices can enhance agrobiodiversity and territorial resilience.

B38 – Rewarding Farmers for “Good Bugs”: How Incentives Shape Habitat and Pest Control

Speaker: NEZHADKHEIROLLAH Somaiyeh (Brandenburg University of Technology Cottbus-Senftenberg (BTU))

Co-authors and additional affiliation info: Chair of Environmental Economics, Brandenburg University of Technology Cottbus-Senftenberg

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Instead of using chemicals, farmers can let “good bugs” (natural enemies) take care of the “bad bugs.” However, these helpful predators need safe places to live, like flower strips and grasslands, which are called non-cropland habitats (NCH). The issue is that developing NCH reduces cropland and farmers’ revenue. We employ an agent-based landscape model that combines ecology and economics, with land shifting between cropland and NCH based on conservation payments. The payments consist of a base amount plus a bonus granted to farmers living near NCH. Higher pest pressure cuts profits, but payments build NCH, support predators, and stabilize profits.

C38 – Etude comparative de la photoréception extraoculaire médié par les opsines chez les Crinoïdes et les concombres de mer

Speaker: NONCLERCQ Youri (Laboratoire de biologie des organismes marins et biomimétisme)

Co-authors and additional affiliation info: Youri Nonclercq[1,*], Minglei Ma[**], Igor Eeckhaut[*], Patrick Flammang[*], Marjorie Lienard[**], Jérôme Delroisse[*] / [*] Laboratoire de biologie des organismes marins et biomimétisme, Université de Mons; [**] Laboratoire de biologie moléculaire des systèmes sensorielles, GIGA, Université de Liège

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Nous avons étudié la photoréception extraoculaire médiée par des opsines chez les crinoïdes et les holothuries. Nos études génomiques indiquent que les crinoïdes présentent un nombre réduit d'opsines alors que les holothuries en ont une grande diversité. L'expression in vitro des opsines rhabdomériques chez ces deux groupes révèle qu'elles perçoivent les courtes longueurs d'ondes (lumière bleue). Ces résultats corroborent nos tests comportementaux (déplacement significatif induit par la lumière bleu). Finalement, une détection immunocytochimique révèle la présence d'opsines dans le plexus nerveux et à l'extrémité des podia chez les crinoïdes et dans des cellules sensorielles des tentacules buccaux chez les holothuries.

A39 – The Impact of Wind Energy Development in Protected Areas:The case of Greece

Speaker: RAFTOPOULOS Christos (University of Peloponnese)

Co-authors and additional affiliation info: PhD cand. Christos Raftopoulos, Professor Thomas Alexopoulos / Dept. of Economics and Technology, University of Peloponnese

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Our study specifically aims to synthesize current literature and highlight distinct knowledge gaps in the relationship between wind energy, eco- tourism and protected area management. The analysis attempts to cover research gaps and define key objectives in the form of 2 main questions: 1) How much is the consumer surplus affected from the negative externalities of wind farm deployment in Natura environments? 2) How can this impact be controlled through mitigation strategies?The dissertation will offer actionable recommendations for balancing renewable energy development with environmental preservation. By quantifying the welfare implications of wind energy projects, the research equips policymakers with empirical evidence to support decision-making processes.

B39 – CRISPR-Cas9-mediated insertion of a fluorescent reporter enables single-cell analysis of nitrogenase expression in Rhodospirillum rubrum

Speaker: TOUBEAU Laura (BioSciences)

Co-authors and additional affiliation info: Laura Toubeau[*,1], Matic Kostanjšek[2], Ruud A. Weusthuis[2], Ruddy Wattiez[1], Baptiste Leroy[1]. / [1] Department of Proteomics and Microbiology, University of Mons, Avenue du champs de Mars 6, 7000, Mons, Belgium; [2] Department of Bioprocess Engineering, University of Wageningen, Droevendaalsesteeg 1, 6708 PB, Wageningen, The Netherlands

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Population-averaged approaches often overlook phenotypic heterogeneity that influences bacterial metabolism. Here, we examine nitrogenase expression at single-cell level in the purple non-sulfur bacterium Rhodospirillum rubrum during photoheterotrophic growth on organic acids. A CRISPR-Cas9 strategy generated a chromosomal nifK::DsRed fusion, maintaining native regulation while enabling

fluorescence-based detection of expressing cells. Microscopy showed homogeneous nitrogenase expression under diazotrophic conditions, whereas rare fluorescent cells appeared in ammonium-replete cultures, suggesting metabolically distinct subpopulations. These results reveal dynamic regulation of nitrogen fixation beyond bulk measurements and illustrate how genome-integrated reporters support important fundamental studies of cellular specialization and metabolic heterogeneity in diverse purple phototrophic bacteria.

Sciences humaines & sociales – Humanities & Social Sciences

C39 – Traduction automatique neuronale et IA générative en santé : entre performance linguistique et sécurité clinique

Speaker: ABRASSART Marie (Université de Mons)

Co-authors and additional affiliation info: Marie Abrassart / UMONS, TraLaNed, UPHF, LARSH

Face à l'accroissement migratoire, les barrières linguistiques compromettent l'égalité d'accès aux soins pour les minorités. L'émergence de la traduction automatique neuronale et de l'intelligence artificielle générative offre des solutions immédiates, mais soulève des questions de fiabilité clinique et éthique. Cette étude mixte comparera quatre outils via un corpus de textes médicaux et paramédicaux du français vers le néerlandais et l'anglais. Des entretiens avec des patients et des professionnels de santé permettront d'évaluer la perception des atouts et des risques liés à ces technologies. L'objectif est d'évaluer la fiabilité de ces outils et de confronter leurs performances aux réalités du terrain.

A40 – Implementing Gender Equality Plans: A Qualitative Study of Universities in Greece and Spain

Speaker: ALEXANDROU Paraskevi (University of the Peloponnese)

Co-authors and additional affiliation info: Paraskevi Alexandrou / University of the Peloponnese

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Gender Equality Plans (GEPs) have become mandatory for European universities seeking Horizon Europe funding under the EU Gender Equality Strategy 2020-2025. It is a qualitative study examining how GEPs are implemented in selected universities in Greece and Spain and identifying the factors that influence their implementation. After conducting pilot research across three Greek public universities, findings show that Gender Equality Committees are central but face uneven, often compliance-driven implementation. EU conditionality is the main driver, while political will, leadership commitment, resources, administrative support, and institutional culture critically shape outcomes. Comparative case study conclusions will be provided once the Spanish results are available.

B40 – Science communication at EUNICE: mapping to enhance the impact of research

Speaker: AMBRÓSIO Susana (Polytechnic University of Viseu)

Co-authors and additional affiliation info: Susana Ambrósio[1], Maria Figueiredo[1,2]. / [1] CI&DEI, Polytechnic University of Viseu; [2] CI&DEI, ESEV, Polytechnic University of Viseu

Science communication plays a central role in promoting scientific literacy, strengthening public trust in science, and enhancing the social value of scientific knowledge. In the context of EUNICE, characterised by institutional, cultural, and disciplinary diversity, it is crucial to understand how researchers engage in science communication to design a shared strategy across the Alliance and maximise the impact of its research. The Scicomm@EUNICE study intends to map existing initiatives and analyse researchers' perceptions, practices, and challenges. The findings are intended to support the development of a shared science communication strategy to enhance the impact of science developed within the EUNICE context.

C40 – Vers un Espace durable : l'encadrement juridique des débris spatiaux

Speaker: BANCHEREAU Théo (C3RD (Faculté de droit de l'Université Catholique de Lille))

Co-authors and additional affiliation info: Théo Banchereau / C3RD

Les débris spatiaux génèrent de nombreux risques, que ce soit dans l'espace extra-atmosphérique ou sur Terre. A terme, leur accumulation en orbite pourrait priver l'humanité de son accès à l'espace. Or, du fait de l'augmentation du nombre d'acteurs et de lancements d'objets dans l'espace, le nombre déjà élevé de débris en orbite continue de croître. L'objectif de ma thèse est d'interroger la suffisance et la pertinence du cadre juridique actuel pour encadrer les risques liés aux débris spatiaux, d'effectuer une étude globale des règles relatives à ces débris, afin de formuler des propositions pour un encadrement juridique concourant à l'avènement d'un Espace durable.

A41 – Modeling ESG Controversies: Methods and Evidence from Machine Learning

Speaker: BARAIBAR-DIEZ Elisa (Universidad de Cantabria)

Co-authors and additional affiliation info: Elisa Baraibar-Diez, María D. Odriozola, Ignacio Llorente / University of Cantabria

This study examines the use of supervised machine learning techniques to predict corporate ESG controversy levels in the banking sector. Using a sample of 215 banks from 34 countries, ESG controversy scores are classified into four levels ranging from high to very low. Several algorithms—K-Nearest Neighbors, Random Forest, and XGBoost—are implemented and compared. Results show moderate predictive performance, largely affected by class imbalance, with models performing best in identifying very low controversy firms. Firm size and ESG ratings emerge as key predictors. Despite limitations, findings highlight the potential of machine learning as a complementary tool for ESG risk assessment and early controversy detection.

B41 – Co-conception d'un système collaboratif d'aide à la mobilite pour les personnes avec déficience intellectuelle

Speaker: BAULT Constance (LAMIH UMR CNRS 8201, UPHF)

Co-authors and additional affiliation info: Constance Bault, Sophie Lepreux, Káthia Marçal de Oliveira, Christophe Kolski / LAMIH UMR CNRS 8201, UPHF

Les personnes avec déficience intellectuelle rencontrent de nombreuses difficultés dans la vie quotidienne, notamment dans leurs déplacements. Ce travail propose un système collaboratif pour les aider lors de leurs déplacements. Afin de définir la collaboration, le modèle des 3C est utilisé : Communication, Coopération, Coordination. La collaboration s'effectue entre une personne en mobilité, avec déficience intellectuelle, et un aidant à distance, qu'il soit issu de l'entourage professionnel ou personnel. Ce poster présente les différentes étapes déjà menées de la co-conception employée pour créer le système. Ce travail est financé par le PEPR eNSEMBLE et en partenariat avec les associations Nous Aussi, APEI de Denain et du Valenciennois.

C41 – Teacher well-being in French-speaking Belgium: elaborating a typology using Q methodology.

Speaker: BERTIEAUX Denis (Université de Mons)

Co-authors and additional affiliation info: Bertieaux Denis[1], Goyette Nancy[2], Duroisin Natacha[1]. / [1] Université de Mons - Ecole de Formation des Enseignants - Service d'Education et des Sciences de l'Apprentissage; [2] Université du Québec à Trois-Rivières - Département des Sciences de l'Education

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In general, and especially in French-speaking Belgium, teacher well-being receives little attention in official discourse and in the scientific literature. This neglect is partly explained by a stronger focus on ill-being and its consequences (burnout, absenteeism). This study therefore aims to document teachers' representations of well-being in greater detail, as well as the hierarchy of its constituent dimensions. A Q-methodology study (Stephenson, 1953) was conducted with Belgian teachers between April and December 2025 (N = 205). Main results indicate a three-part representation grounded in working conditions, psychological resources, or a positive relationship to work.

A42 – Quand inclure divise : analyse lexicale du curriculum légal relative à l'inclusion dans l'enseignement supérieur en Fédération Wallonie-Bruxelles

Speaker: BOSSUT Elise (UMONS)

Co-authors and additional affiliation info: Bossut Elise, Carton Tabtaha, Lahaye Willy & Glineur Charles / UMONS

Les politiques d'inclusion dans l'enseignement supérieur visent à réduire les inégalités, mais peuvent aussi les renforcer. En FW-B, plusieurs textes législatifs encadrent l'accessibilité et le soutien aux étudiants. Ce cadre révèle des tensions liées aux publics visés et aux conceptions de l'inclusion, influencées par des dynamiques locales et globales. L'inclusion recouvre des dimensions sociales, scolaires et liées au handicap. Une analyse lexicale de trois textes juridiques, réalisée avec Tropes, montre une forte prédominance de la dimension du handicap. Ce résultat souligne la centralité des aménagements spécifiques et invite à interroger la portée réelle de l'inclusion et sa mise en œuvre.

B42 – Ce que la maturité technologique nous apprend sur la diffusion

Speaker: BRZEZICHA Arno (UMONS)

Co-authors and additional affiliation info: FWEG

À l'hôpital, l'impression 3D s'impose pas à pas. Elle va des modèles anatomiques aux dispositifs plus complexes tels que des guides, des implants ou des médicaments. Pourtant, une application mûre

ne se diffuse pas toujours en pratique clinique. Ce short paper cartographie les usages hospitaliers à partir d'une revue systématique. Il mobilise l'échelle Technology Readiness Level pour comparer les cas. Les résultats dessinent un continuum entre usages routinisés et développements expérimentaux. L'analyse met en évidence un écart entre faisabilité et adoption. La diffusion dépend d'un alignement avec le cadre réglementaire. Elle requiert un modèle économique, des capacités internes et une gouvernance locale.

C42 – Habiter les marges de l'école

Speaker: CARTON Tabatha (UMONS)

Co-authors and additional affiliation info: Elise Bossut, Eline Lejeune, Elena Gianoultsis, Floriane Joertz, Loic Seran, Willy Lahaye & Charles Glineur / UMONS - FPSE - SPAS

À la croisée de logiques éducatives antagonistes, cette communication analyse le rapport au savoir (Charlot, 1999) d'enfants scolarisés dans des écoles démocratiques en Belgique francophone. Fondées sur une organisation horizontale, une faible hiérarchie et une large autonomie éducative (Legavre, 2021), ces écoles sont, en Belgique, assimilées à l'enseignement à domicile, ce qui expose les familles à des dispositifs évaluatifs et à une tension entre liberté revendiquée et normalisation institutionnelle (Carton et al., 2025). À partir d'entretiens menés auprès de 11 enfants âgés de 9 à 16 ans, l'analyse met en évidence des formes de contrôle intériorisé, des tensions identitaires liées à l'étiquetage scolaire (Becker, 2024) et des ajustements subjectifs face à un cadre paradoxal (Dubet, 2002).

A43 – Digital Transformation in Sports Management

Speaker: CHRISTODIMITROPOULOU Maria (University of Peloponnese)

Co-authors and additional affiliation info: Maria Christodimitropoulou

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The dissertation investigates digital transformation in Greek sports management. Despite its strategic importance, sports organizations often adopt digital transformation in a piecemeal fashion, resulting in low digital maturity. Through a mixed-methods methodology, grounded in the TOE and TAM models, the research assessed the digital readiness of 401 executives. Findings reveal a moderate maturity level, with technological infrastructure and organizational readiness as the strongest predictors for adoption. The main barriers are implementation costs and a lack of digital skills. Successful transition requires strategic commitment, culture change, personalized plans and investment in people.

B43 – The impact of atmospheric conditions on the dynamics and route selection of the Way of Saint James

Speaker: CONDE ORIA Francisco (University of Cantabria)

Co-authors and additional affiliation info: Francisco Conde Oria / University of Cantabria

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The climate-tourism potential of the French Way and the Northern Way is analyzed by comparing climate data and pilgrimage flows to identify behavioural patterns. Using an adapted Climate Index for Tourism (CIT), differences in climatic comfort and their relationship with the distribution of domestic and international pilgrims are assessed. The Northern Way offers more favorable conditions, especially in summer, while the French Way shows a bimodal distribution with peaks in months

bordering summer. International pilgrims display bioclimatic-driven behaviour, whereas domestic pilgrims show calendar-driven behaviour, mainly in summer.

C43 – Traduire le jeu vidéo autrement : conception et évaluation d'un système de traduction automatique neuronale spécialisé

Speaker: COPET Simon (Université de Mons)

Co-authors and additional affiliation info: Simon Copet / Université de Mons, Université libre de Bruxelles, Liège Game Lab

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La traduction automatique (TA), corrigée par un humain (ou post-édition), occupe une place croissante dans l'industrie du jeu vidéo. Toutefois, les systèmes existants demeurent peu adaptés à ce domaine en raison de la rareté des données. Nous présenterons les résultats d'un premier moteur de traduction automatique neuronale entraîné exclusivement sur un corpus vidéoludique.

A44 – Assessing Children's Facial Emotion Recognition in Forensic Inpatients With Deviant Sexual Interest and Emotional Congruence with Children: Thesis design

Speaker: CORNEZ Florian (Université de Mons)

Co-authors and additional affiliation info: Cornez, F.[1], Saloppé, X.[2,3,4], Pham, T.H.[1,2] & Tiberi, L.A.[1]. / [1] Forensic Psychology Department, Psychology and Educational Sciences Faculty, University of Mons (UMONS), Mons, Belgium; [2] Research Center of Social Defense, Tournai, Belgium; [3] CNRS, UMR 9193 - SCALab – Sciences Cognitives et Sciences Affectives, University of Lille, Lille, France; [4] Service de Psychiatrie, Hôpital de Saint-Amand-les-Eaux, France

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Preventing child sexual abuse is a main objective in Forensic Psychology. The SARN identifies four dynamic risk domains: deviant sexual interests, distorted attitudes, socio-affective functioning, and self-management — the last not investigated here. Yet their interplay and association with emotion recognition remain insufficiently studied in forensic sexual abusers. Using child facial stimuli, four studies examine the prevalence of these offense-supportive mechanisms, their predictive role on emotion recognition, the mediating role of emotion recognition on recidivism risk, and distinct offense-supportive profiles via latent profile analysis. Findings may refine risk assessment and optimize targeted clinical interventions.

B44 – Le virtuel peut-il remplacer le réel ? Évaluation d'un dispositif immersif pour la transmission de la mémoire

Speaker: DE SY Loïc (UMONS)

Co-authors and additional affiliation info: Loïc De Sy, Romain Beauset & Natacha Duroisin / UMONS, Ecole de Formation des Enseignants, Service EDUcation et Sciences de l'Apprentissage

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Les nouvelles technologies, à l'instar de la réalité virtuelle, suscitent un intérêt croissant dans le domaine de l'éducation (Lewis et al., 2021). Toutefois, bien que de nombreuses recherches comparent des dispositifs immersifs à des approches plus traditionnelles, la capacité de ces technologies à se substituer pleinement à l'expérience réelle reste discutée et encore insuffisamment étayée (Santilli

et al., 2025). Cette étude comparative cherche à identifier les effets d'un dispositif immersif sur la compréhension historique, l'appropriation d'un lieu de mémoire et l'engagement réflexif auprès d'élèves de l'enseignement primaire et secondaire. Ce poster présente la méthodologie envisagée ainsi que les résultats escomptés.

C44 – Diversité et travail de mémoire. Le cas de la Purge LGBT dans les forces armées canadiennes durant la guerre froide.

Speaker: GÉVA Clémence (UMONS)

Co-authors and additional affiliation info: Clémence Géva, Marielle Bruyninckx, Dimitri Cauchie / Faculté de psychologie et des sciences de l'éducation - Service de développement humain et traitement des données

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Lors de la guerre froide, des citoyen·nes canadien·nes ont vécu des discriminations et des licenciements sur la seule base de leur orientation sexuelle réelle ou supposée. Bien que l'on puisse penser que les mentalités ont progressé sur ces questions, l'actualité internationale rappelle que certains droits demeurent fragiles et jamais totalement acquis. Cette recherche porte sur l'histoire de survivant·es de la Purge LGBT, dont les propos ont été recueillis grâce à un récit de vie et un entretien. Les données ont été complétées par les résultats des sujets à l'échelle de résilience de Connor et Davidson.

A45 – Massification et collaboration : expérimenter l'(auto)régulation

Speaker: GIANOULTSIS Elena (Université de Mons)

Co-authors and additional affiliation info: Gianoultsis Elena, Glineur Charles, Carton Tabatha / Université de Mons

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Ces dernières décennies, l'enseignement supérieur a connu une massification importante, sans garantir une réelle égalité des chances de réussite (Durand, 2021). Dans ce contexte, les enseignant·es adaptent leurs pratiques, notamment en mobilisant le travail collaboratif, qui ne bénéficie toutefois pas équitablement à tous (Baudrit, 2009 ; Barats et al., 2018). Cette contribution analyse l'usage d'un outil d'(auto)régulation dans des travaux de groupe impliquant 292 étudiants. Les premiers résultats montrent une amélioration du climat collaboratif, de la participation et de la gestion des conflits, ainsi qu'une meilleure identification des forces et limites individuelles. Ces éléments invitent à interroger le potentiel de ce dispositif pour favoriser un cadre plus équitable d'apprentissage collaboratif dans l'enseignement supérieur massifié.

B45 – Les formes d'adhésion parentale comme prisme de la participation en protection de l'enfance

Speaker: GLINEUR Charles (Université de Mons)

Co-authors and additional affiliation info: Charles Glineur, Elise Bossut, Loic Seran, Eline Lejeune, Elena Gianoultsis, Floriane Joertz, Willy Lahaye / UMONS

Ce poster présente une étude qualitative menée auprès d'intervenants Services d'accompagnement mission socio-éducative en Fédération Wallonie-Bruxelles, portant sur la participation des familles en contextes d'aide consentie et contrainte. À partir de 31 entretiens analysés par catégories conceptualisantes, elle montre que la participation est majoritairement interprétée comme une adhésion au

cadre prescrit. Dix postures d'adhésion sont identifiées, révélant des ajustements et résistances aux normes institutionnelles. L'étude met en évidence une contrainte implicite dans l'aide consentie et souligne que, malgré leurs différences, les deux formes d'aide mobilisent des logiques de pouvoir, limitant la portée émancipatrice de la participation.

C45 – Vivre et travailler la transition écologique dans l'agriculture

Speaker: HECQUET Corentin (UMONS)

Co-authors and additional affiliation info: Hecquet Corentin[1], Hermesse Julie[2], Loodts Nicolas[2], Gianni Malica[2]. / [1] UMONS et ULiège; [2] UCLouvain

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Projet AGRICONVERT : une enquête ethnographique menée en Wallonie sur les transformations écologiques en agriculture. Nous étudions comment les agriculteurs et agricultrices vivent ces changements (opposition, résistance, adoption, changement de pratiques . . .). L'analyse met en évidence le rôle structurant des relations intergénérationnelles et de genre dans les trajectoires de transition. Souvent abordée sous un angle technique, la transition écologique est ici envisagée à travers ses dimensions socio-symboliques. Elle révèle les tensions et arbitrages auxquels les agriculteurs et agricultrices sont confronté·e·s lorsque les objectifs écologiques se heurtent aux réalités du travail agricole.

A46 – Influence de l'espace de travail sur la pensée divergente des chercheurs

Speaker: HID Ethan (UCLouvain)

Co-authors and additional affiliation info: Hid, E., Bernard, C., Mercier, R. & Dupond, P. / UCLouvain

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La pensée divergente est une composante cognitive essentielle dans de nombreuses professions, notamment dans le domaine professionnel de la recherche. Une enquête par questionnaire (Dupond, 2019) a été menée auprès de personnels scientifiques universitaires belges et français (N = 247) afin d'évaluer le lien entre le niveau de développement de la pensée divergente et les caractéristiques physiques et matérielles de l'espace de travail. Les analyses révèlent des corrélations significatives entre certaines caractéristiques de l'espace de travail et le niveau de pensée divergente. A titre d'exemple, les bureaux aux murs colorés (vert ou rose) sont associés à des scores supérieurs (p=0.004).

B46 – Les dynamiques informelles du travail en réseau dans la lutte contre la précarité infantile en FW-B

Speaker: JOERTZ Floriane (UMONS)

Co-authors and additional affiliation info: JOERTZ, Floriane; LEJEUNE, Eline; BOSSUT, Elise; SERAN, Loic; GIANOULTSIS, Elena; CARTON, Tabatha; GLINEUR, Charles; LAHAYE Willy / UMONS, FPSE, Service de Pédagogie et Andragogie sociales

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Une recherche menée en FW-B auprès d'associations actives dans la lutte contre la précarité infantile a documenté les dynamiques de travail en réseau (Cultiaux, 2018 ; Bartholomé, 2007). L'analyse révèle que la fluidité des réseaux repose essentiellement sur des liens informels fondés sur la confiance interprofessionnelle (Schweyer, 2005). Ces espaces informels permettent de réguler les tensions générées par des temporalités divergentes : administratives, financières, rythme du bénéficiaire,

etc. (Bouquet, 2011) et d'opérer les ajustements continus que requiert l'intervention. Pourtant, ces dynamiques relationnelles demeurent peu reconnues dans les cadres institutionnels, alors même qu'elles facilitent l'articulation des acteurs au sein du réseau.

C46 – Artificial Intelligence in Conservation Science: Designing a Multi-Level Digital Interpretation Framework for Museum Audiences

Speaker: KAPSOKOLI Ouriana (UNIVERSITY OF THE PELOPONNESE)

Co-authors and additional affiliation info: Ourania Kapsokoli, PhD Candidate, Supervisor: Dr. Wallace Emmanuel / Department of Informatics and Telecommunications - Knowledge and Uncertainty Laboratory, Tripoli, University of the Peloponnese

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This PhD research explores how Artificial Intelligence (AI) can mediate the interpretation of conservation processes for diverse museum audiences. It investigates the intersection of cultural heritage policy, conservation science, and AI applications to enhance accessibility, visibility, and understanding of specialized field of scientific conservation. The study designs a multi-level digital framework using freely available AI tools, including avatars, interactive summaries, and gamified learning for children. Methodology includes case studies, documentation analysis, and observation of conservation interventions. Expected outcomes include a replicable framework for AI-supported museum interpretation and contributions to European digital cultural heritage strategies and data-space initiatives.

A47 – The use of alternative Freinet educational tools in students with special educational needs and their contribution to the promotion of linguistic/communicative, metacognitive and social skills

Speaker: KOTSONOURI Persefoni

Co-authors and additional affiliation info: Persefoni Kotsonouri. / University of the Peloponnese

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The doctoral thesis focuses on the use of alternative educational tools of Freinet pedagogy with students with special educational needs (SEN) with the aim of investigating the contribution of these tools to the promotion of linguistic/communicative, metacognitive and social skills of this population. Participants in the research are 1st, 2nd and 3rd year students of secondary education schools in the municipality of Messinia. The thesis aspires to contribute in the dissemination of the use of alternative methods and practices that focus on the student, his/her needs, experiences and personality.

B47 – Effectiveness of the EyeRADAR method in the assessment of individuals with developmental or acquired dyslexia.

Speaker: KOUNTOURIOTOU Panagiota (University of Peloponnese, Department of Speech and Language Therapy.)

Co-authors and additional affiliation info: Kountouriotou Panagiota, Phd Candidate, Konstantopoulos Konstantinos, Associate Professor

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Dyslexia constitutes one of the most debated issues in the scientific community, partly because it is examined by diverse disciplines that adopt different conceptual and diagnostic frameworks. It is widely described as a neurodevelopmental disorder characterized by persistent difficulties in accurate and/or fluent reading. This study evaluates EyeRADAR as a cutting-edge tool for assessing developmental and acquired dyslexia, addressing key limitations of traditional measures. EyeRADAR is a fast, non-invasive screening method that employs eye-tracking to capture fixation duration, saccadic movements, and regressions, while providing a validated dyslexia probability index based on normative data. This method demonstrates high diagnostic accuracy for early identification and monitoring of targeted interventions.

C47 – Une photo du contrôle inhibiteur pour révéler les mécanismes cachés des apprentissages mathématiques

Speaker: LEBOUTTE Amandine (Université de Mons/ Université de Namur)

Co-authors and additional affiliation info: LEBOUTTE Amandine[1,2], VANHOOLANDT Cédric[2] & WAUTHIA Erika[1]. / [1] Service Éducation et Sciences de l'Apprentissage, École de Formation des Enseignants - Université de Mons; [2] Institut de Recherches en Didactiques et Éducation de l'UNamur, Faculté des sciences de l'éducation et de la formation - Université de Namur

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L'affaiblissement des compétences mathématiques des élèves constitue un enjeu majeur pour les professionnels de l'éducation. Ceci requiert une analyse approfondie des mécanismes cognitifs sous-tendant les apprentissages mathématiques de base, afin de pouvoir les renforcer. Les recherches menées ont établi des liens étroits entre mémoire de travail, flexibilité cognitive et performances mathématiques. Cependant, les liens avec le contrôle inhibiteur demeurent controversés et restent à investiguer. Cette recherche vise (1) à modéliser, dans une perspective développementale, l'implication des processus inhibiteurs dans les apprentissages mathématiques, afin de (2) caractériser différents profils d'élèves et de concevoir des interventions pédagogiques ciblées.

A48 – Penser le climat scolaire autrement : 25 ans d'évolution des politiques éducatives en Fédération Wallonie-Bruxelles

Speaker: LEJEUNE Eline (Université de Mons)

Co-authors and additional affiliation info: Lejeune, E., Carton, C., Glineur, C., Bossut, E., Joertz, F., Gianoultsis, E., Seran, L. & Lahaye, W.

Cette étude analyse l'évolution du discours institutionnel relatif au climat scolaire dans les textes législatifs et réglementaires adoptés en Fédération Wallonie-Bruxelles entre 1999 et 2024. À partir d'une approche qualitative combinée à une analyse lexicale quantitative, elle met en évidence un glissement progressif d'un paradigme sécuritaire et disciplinaire vers une conception globale intégrant le bien-être, la prévention, la participation et la coéducation. Les résultats soulignent la reconnaissance croissante du harcèlement et du cyberharcèlement, tout en révélant des tensions persistantes entre ambitions institutionnelles et conditions concrètes de mise en œuvre dans les établissements.

B48 – Le droit d'accès aux origines

Speaker: LEURENT Maddy (C3RD FLD)

Co-authors and additional affiliation info: Maddy Leurent / C3RD

L'engouement pour la généalogie souligne l'impérieuse nécessité de connaître ses origines, droit consacré par la CEDH dès 1989. Si la loi bioéthique de 2021 lève l'anonymat des donneurs en AMP, ce droit se heurte encore au secret de l'accouchement sous X et aux dérives de l'adoption internationale. L'arrêt Cherrier c. France (2024) illustre ce conflit persistant : la France privilégie souvent le droit au secret des parents au détriment de l'identité de l'enfant (Art. 7 et 8 CIDE). Cette étude analyse l'équilibre fragile des régimes juridiques français et envisage les évolutions nécessaires pour garantir l'accès aux origines personnelles.

C48 – Les normes ESRS comme levier de confiance et de performance

Speaker: LUCAS Nathalie (ED : UPHF / Université Catholique de Lille)

Co-authors and additional affiliation info: LUCAS Nathalie / C3RD

Le cadre juridique des rapports dits « extra-financiers », a évolué lentement depuis les années 70 pour exploser littéralement depuis 2022. L'arrivée de nouvelles normes européennes, la directive CSRD, a permis de passer d'une communication volontaire des enjeux, à un encadrement juridique plus contraignant. Mais comment ne pas effrayer avec une lourdeur administrative ? Comment valoriser la transparence et installer une relation de confiance ? L'objectif est alors de démontrer que la standardisation n'est pas une contrainte vaine : c'est l'outil qui veut transformer la « bonne parole » des entreprises, en réelles données de confiance.

A49 – Les patients internés psychotiques consommateurs de cannabis

Speaker: MANCINI Margaux (UMONS)

Co-authors and additional affiliation info: Mancini, M.[1], Saloppé, X.[2], Tiberi, L.A.[1] & Pham, T.H.[1]. / [1] Service de Psychopathologie Légale; [2] Service de Psychiatrie, Hôpital de Saint-Amand-les-Eaux

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En milieu médico-légal belge, les troubles psychotiques sont les plus prévalents (60 %). Le syndrome de Threat/Control-Override (TCO), caractérisé par des délires de persécution et des hallucinations de commandement, constitue un facteur de risque de comportements violents pouvant être exacerbé par la consommation de cannabis. La littérature se contredit sur les interactions entre les troubles psychotiques, la consommation de cannabis et le risque de comportement violent. À l'aide d'une méthode mixte, cette étude vise à identifier les profils sociodémographiques, diagnostiques, cliniques et de risque de comportements violents et à évaluer les relations entre les symptômes TCO, la consommation de cannabis et les comportements violents.

B49 – Extraction terminologique et IA

Speaker: MEYERS Charlène (UMONS (FTI-EII))

Co-authors and additional affiliation info: Meyers Charlène[1] & Jandrain Tiffany[1,2]. / [1] UMONS; [2] UCLouvain

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La langue, à la base même des LLM, reste perçue comme un outil plutôt qu'un objet d'étude. La posture inverse est adoptée dans cette recherche, qui analyse l'efficacité de trois outils d'IA générative

dans des extractions terminologiques. Il en ressort que l'exploitation de la capacité de raisonner (ou de travailler en chaîne de pensées) de l'IA combinée à un prompt où elle endosse le rôle d'agent-expert améliore considérablement la qualité des réponses fournies. Toutefois, les réponses de l'IA restent peu concluantes et, au vu des ambitions scientifiques actuelles, il est urgent que les recherches en linguistique, terminologie et traduction s'intensifient.

C49 – Effet de la respiration à 6 cycles par minute sur l'anxiété chez l'adulte

Speaker: MILLIEN Eléa (UMONS)

Co-authors and additional affiliation info: Eléa MILLIEN[1], Yaël Irissou[1], Léa Henrard[1], Aurore Colomar[1,2], Isabelle SIMOES LOUREIRO[1]. / [1] Université de Mons, Service de Psychologie Cognitive et Neuropsychologie, CiPsE; [2] Université de Mons, Service de Neurosciences, CiPsE

L'anxiété est un facteur de risque du déclin cognitif. Cette étude explore les effets d'une méthode de respiration guidée menant à un état de cohérence cardiaque. 34 sujets ($X = 60.5 \pm 3$ ans, 10♂et 24♀) ont complété un questionnaire d'anxiété auto-rapportée (STAI-Etat et Trait) avant et après cinq minutes de respiration (6 cycles/minutes). L'anxiété-Etat a significativement diminué après l'exercice de respiration (Wilcoxon = 307, $p =< .001$), tant chez les sujets ayant une anxiété-Trait faible (T $\leq$ 55) qu'élevée (T > 55). La respiration guidée réduit l'anxiété, ce qui pourrait la rendre utile en prévention du déclin cognitif.

A50 – Culture and the Rule of Law crisis Reconsidering Melina Mercouri's European Vision

Speaker: PAPADOPOULOS Fotios (University of the Peloponnese)

Co-authors and additional affiliation info:

This poster seeks to illustrate democratic backsliding in the European Union through the lens of what may be termed 'cultural constitutionalism'. While the EU has developed legal and financial mechanisms to safeguard the rule of law, the cultural dimension of its constitutional values remains relatively underexplored. Drawing on the political and cultural legacy of the Greek actress and Minister of Culture Melina Mercouri, the project aims to consider the potential role of culture as a complementary element of EU constitutional resilience. By linking the notions of identity and democracy, it contributes to a broader reflection on EU constitutionalism, suggesting an approach that integrates legal enforcement with cultural legitimacy in support of the Union's democratic foundations.

B50 – La simplification administrative au niveau communal : quels leviers stratégiques pour le Directeur général en Wallonie ?

Speaker: PETRON Sacha (UMONS)

Co-authors and additional affiliation info: Sacha Petron & Julien Vandernoot / Service de finances publiques et fiscalité, FWEG - UMONS

Dans un contexte de complexification normative, de pression budgétaire et de réformes visant à rendre les services publics plus efficients, ce poster vise à investiguer comment le Directeur général

d'une commune wallonne peut devenir un acteur clé de la simplification administrative, tout en garantissant sécurité juridique, qualité du service public et efficience organisationnelle.

C50 – L'adoption de systèmes d'intelligence artificielle générative au sein des organisations : revue systématique de la littérature

Speaker: RANALLI Stephane (UMONS - FWEG)

Co-authors and additional affiliation info: Stéphane Ranalli / UMONS

L'essor de l'intelligence artificielle générative, porté par la démocratisation de ChatGPT, soulève un enjeu central : comprendre comment ces technologies sont adoptées et intégrées au sein des organisations. En mobilisant une revue systématique de la littérature conduite selon PRISMA, nous analysons 38 articles. Nous combinons une analyse bibliométrique et une analyse de contenu des déterminants de l'adoption, structurée par un cadre TOE enrichi des dimensions individuelles et éthiques. Les résultats mettent en évidence une forte concentration sur ChatGPT, sur le secteur de l'enseignement, sur des terrains asiatiques ainsi qu'une prédominance des approches d'adoption individuelle. Les critères technologiques et organisationnels dominent, tandis que les dimensions environnementales et éthiques restent sous-investiguées.

A51 – Analyse comparative des dynamiques de la résilience individuelle et organisationnelle dans les organisations publiques en contexte de crises

Speaker: SANKHARE Cheikhou (UPHF)

Co-authors and additional affiliation info: Cheikhou SANKHARE[1], Gulsun ALTINTAS[1]. / [1] Laboratoire LARSH

Cette recherche vise à combler certaines lacunes de la littérature sur la résilience organisationnelle en mettant en évidence son caractère dynamique et processuel. Elle répond à l'appel de la communauté scientifique concernant la compréhension du passage de la résilience individuelle à la résilience organisationnelle, envisagé comme un processus non linéaire reposant sur des mécanismes organisationnels. En mobilisant la théorie de l'acteur-réseau, l'étude analyse les dynamiques de traduction impliquant acteurs humains et non humains. Sur le plan managérial, elle propose des leviers d'action pour les universités et élabore un modèle favorisant leur pérennité face aux incertitudes contemporaines.

B51 – Business and Human Rights: Limits of the Current International Framework

Speaker: SANTOS DÍEZ Yaiza (Universidad de Cantabria)

Co-authors and additional affiliation info: Yaiza Santos Díez / Doctorate in Legal and Business Sciences, University of Cantabria

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International regulation of the relationship between business and human rights is based primarily on non-binding standards, which has limited its effectiveness in preventing violations and providing access to justice for victims, especially in transnational contexts. The purpose of this research is to analyze the structural obstacles of the current system, which has a significant impact on social and environmental rights. Likewise, it is intended to highlight the need to move towards a binding

international legal framework that guarantees effective protection of human rights in the face of business activities.

C51 – Infanticide in Euripides' fragmentary plays and his influence on Visual Arts

Speaker: SIMANTIRI Maria (University of the Peloponnesse)

Co-authors and additional affiliation info: Maria Simantiri / University of the Peloponnesse

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Infanticide has been a particularly popular topic for Euripides. Both extant tragedies and plays in fragments feature infanticide or attempted infanticide. The aim of this study is to shed light on the aspect of infanticide in fragmentary plays; to investigate the causes and ways of killing, the presence of children in these tragedies, and the outcome of the offender. Thus, a more comprehensive view of the representation of infanticide on stage is provided, while the interplay between the performing and visual arts in antiquity is also revealed. Representations in vases and reliefs of antiquity have an interesting story to tell.

A52 – Competing Beyond Prices: Amenity-based Differentiation between Airbnb and Hotels

Speaker: STARON Thi Hông Huê (UMONS - FWEG)

Co-authors and additional affiliation info: Staron Thi Hông Huê, Emmanuel SUKADI A SUKADI / Soci&ter

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(Work in progress) The study investigates amenity-based differentiation between Airbnb and traditional hotels in Spain. Utilizing a dataset of about 500,000 listings , the research aims to apply co-occurrence network analysis and Multidimensional Scaling (MDS) to identify strategic amenity clusters. It seeks to contrast Airbnb's "home-benefit" bundles with standardized hotel benchmarks, particularly regarding safety and regulatory compliance. By shifting focus from price-centric rivalry to multidimensional product differentiation, the research's goal is to show how attribute configurations shape market competition. This research assists policymakers in addressing regulatory gaps and helps hotel managers adapt to evolving traveler expectations.

B52 – Narratives of Inclusion and Exclusion in Higher Education Trajectories of Students Belonging to Prioritized Interest Groups at a Colombian University

Speaker: TABARQUINO Diana

Co-authors and additional affiliation info: Diana Tabarquino. / Universidad de Cantabria

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Although access to higher education for students belonging to Prioritized InterestGroups has expanded in Colombia, this progress has not been accompanied byequivalent guarantees of equitable persistence, well-being, or degree completion.In many instances, higher education institutions continue to operate throughhomogenizing institutional logics that privilege normative trajectories andsystematically render diverse student pathways invisible.Pedagogical, administrative, and attitudinal barriers remain

structurallyembedded within everyday institutional practices, giving rise to normalized yetpersistent forms of exclusion that shape students' lived university experiences.Addressing these dynamics requires moving beyond deficit-oriented or purelyquantitative approaches and engaging critically with the narratives of studentswho navigate higher education from historically unequal social, cultural, andterritorial contexts

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C52 – Encre et crime - de la presse au roman policier

Speaker: TANZI Valentina (Université Polytechnique Hauts-de-France)

Co-authors and additional affiliation info: Valentina Tanzi / LARSH, UPHF

Avec ce poster, nous montrons comment la presse a joué un rôle fondamental dans le développement du roman policier. C'est entre le XVIII^{e} et le XIX^{e} siècle que le genre se définit comme expression du conflit entre rationalité et irrationalité. Le roman policier devient outil de vulgarisation scientifique et reflet du système judiciaire. L'industrialisation et l'expansion urbaine du XIX^{e} siècle, avec l'augmentation de la criminalité, alimentent les récits judiciaires publiés dans la presse. Dans ce contexte, le roman policier émerge progressivement : d'abord sous la forme du roman judiciaire au ton mélodramatique, puis en donnant une place plus centrale à l'enquête et au détective.

A53 – The Impact of Coach's Gaze and Drawing on Soccer Tactical Scene Memorization: Moderation by Individual Differences

Speaker: TLILI Sabrine (Université Polytechniques Hauts de France)

Co-authors and additional affiliation info: Sabrine TLILI, Hatem BEN MAHFOUDH, Bachir ZOUDJI

To enhance tactical memorization from narrated diagrams, this study examined whether coach gaze behavior and dynamic drawing influence learning efficiency and whether these effects are moderated by visuospatial ability (VSA) and expertise. Experts (N = 79) and novices (N = 77) were randomly assigned to static drawing, dynamic drawing, or dynamic drawing/shifting gaze conditions. Results revealed a significant three-way interaction indicating an expertise reversal effect: high-VSA novices benefited most from dynamic drawing with shifting gaze, whereas low-VSA experts showed greater efficiency with static drawing. Findings highlight the importance of learner-adaptive instructional design in multimedia learning environments.

B53 – Anxiété mathématique et contrôle inhibiteur réactif chez l'adolescent

Speaker: URBAIN Sarah (UMONS)

Co-authors and additional affiliation info: Sarah URBAIN & Erika WAUTHIA

L'anxiété mathématique (AM) serait associée à des déficits d'inhibition exacerbés lors du traitement de stimuli mathématiques, contribuant à une diminution des performances. Quarante-cinq adolescents (30 filles et 15 garçons, Mâge = 14.06 ; ET = 0.94) présentant des niveaux élevés et faibles d'AM ont réalisé deux tâches de Flanker évaluant l'inhibition réactive. Les résultats ont révélé un effet d'incongruence significatif, sans différence entre groupes, tant lors du traitement de stimuli neutres (flèches) et de stimuli mathématiques (chiffres). Ces données suggèrent que l'inhibition réactive

serait préservée dans l'AM, invitant à explorer d'autres processus inhibiteurs, telles que l'inhibition proactive.

C53 – Protocole expérimental de récolte des informations de conception architecturale dans les apprentissages par compétence. Une approche instrumentée.

Speaker: VAN HOLM Thomas (UMONS / UPHF)

Co-authors and additional affiliation info: Thomas VAN HOLM / Service CPMM (FA+U UMONS) et Larch-Devisu (UPHF)

Les apprentissages de la conception architecturale sont fréquemment questionnés par rapport à leur méthode pédagogique. Notre recherche entend proposer une assistance à la conception architecturale, d'une part pour équiper les étudiants d'une aide à la conception mais également pour assister les enseignants dans leurs tâches d'évaluation. Dans cette optique, nous nous interrogeons sur comment récolter les traces de l'organisation de l'activité des étudiants en architecture. Nous proposons un protocole expérimental de recueil de données basé sur trois variables d'analyse : les activités, les stratégies de conception et les relations à soi, aux autres, à la tâche et à la situation.

A54 – Workers and their instrumentalization by economic elites./ Les travailleurs et leur instrumentalisation par les élites économiques.

Speaker: VASSILOPOULOS Miltiades Dimitrios (University of Peloponnese)

Co-authors and additional affiliation info: Miltiades Vassilopoulos

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This thesis explores the intricate political economy of revolt by analyzing the intersection of precarious labor conditions and the instrumentalization of the working classes by competing factions of the economic elite. Using the Ciompi Revolt of 1378 as a primary case study, the research demonstrates how the popolo minuto—disenfranchised textile workers—were not merely spontaneous actors but were often strategically maneuvered within the broader power struggles of Florence's ruling class. By examining the structural inequities of the guild system and the subsequent 'tooling' of labor grievances for elite political gain, this study sheds light on the recurring historical pattern where grassroots economic desperation is leveraged by elite interests to reshape institutional hierarchies.

B54 – Les vulnérabilités et le juge administratif

Speaker: VILLE Augustine (ED PHF - C3RD)

Co-authors and additional affiliation info: VILLE Augustine / C3RD

La présente thèse porte sur le droit au juge des personnes vulnérables devant le juge administratif. Juridiquement, la situation de vulnérabilité de l'individu peut emporter des conséquences sur sa situation et sur ses droits fondamentaux. Ainsi, et afin de respecter leur droit au juge, la vulnérabilité des individus doit être prise en considération par le juge administratif. L'objectif de ma thèse est donc d'étudier les règles du contentieux administratif pour vérifier l'adaptation des règles procédurales et des moyens mis à disposition du juge administratif à la vulnérabilité des individus et proposer des perspectives d'amélioration le cas échéant.

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Let us also not forget the many other members of UMONS, and in particular the support services who supported us throughout the preparation of the event — our warmest thanks to all of them!

Finally, we thank our sponsors, who are among the UMONS research institutes, for making this event happen.