University of Cambridge:
XXI Symposium of Mexican Students and Studies in the UK

Tuesday May 28th 2024

Hour	Event	Venue	Participants	Abstract
09:00 - 10:00	Welcome & opening remarks Conference: Fostering science and innovation through capacity building	Judge Business School - Lecture Theatre 1	Santiago Molina, Senior Policy Manager UKRI	The digital age is fueled by a constant stream of scientific and technological breakthroughs. Fields like information technology, artificial intelligence, and quantum computing exemplify the critical role innovation plays in driving economic and social transformation. A nation's capacity to foster these advancements is directly linked to the strength of its National Innovation System (NIS). This dynamic network, composed of individuals, institutions, and resources, serves as a catalyst for creativity, collaboration, and knowledge exchange. Analysing the internal factors within the UK's innovation ecosystem can shed light on how these factors influence the nation's ability to generate scientific breakthroughs as well as provide valuable lessons on how to foster a productive research environment in other countries.
10:30 - 11:00	Seminar: Immersive Eco-Fashion Experience: A Virtual Reality Framework with Conversational Agent for Sustainable Fashion Engagement	King's College - Audit Room	Diana Hernandez Robert Gordon University	The textile industry is now recognized as a major global polluter, with manufacturing processes consuming vast amounts of resources and resulting in the disposal of tons of non-degradable textiles in landfills. This study focuses on the development of a systematic approach to create a Virtual Reality (VR) experience with a conversational agent dedicated to sustainable fashion. This framework research aims to explore innovative ways to engage, educate, and inspire contemporary consumers on the significance of traditional fashion and textile items, considering their heritage, value, and environmental impact.
11:05 - 11:35	Seminar: Estimating the environmental impacts of global lithium-ion battery supply chain	King's College - Audit Room	Jorge Llamas University of Nottingham	A sustainable low-carbon transition via electric vehicles will require a comprehensive understanding of lithium-ion batteries' global supply chain environmental impacts. Here, we analyse the cradle-to-gate energy use and greenhouse gas emissions of current and future nickel-manganese-cobalt and lithium-iron-phosphate battery technologies. We consider existing battery supply chains and future electricity grid decarbonization prospects for countries involved in material mining and battery production. This study can inform global and regional clean energy strategies to boost technology innovations, decarbonize the electricity grid, and optimise the global supply chain toward a net-zero future.

11:40 - 12:10	Seminar: The Formulation and Deposition of Superhydrophobic Coatings Consisting of Exclusively Food-Grade Waxes	King's College - Audit Room	Brenda Resendiz Díaz Queen Mary University of London	Water-repellent plant-derived materials are a promising class of materials for the fabrication of sustainable superhydrophobic coatings. Many plant-derived waxes can also be considered safe for human consumption, which could allow for the application of food-grade waxes (FGW) in applications such as food packaging. Here, we report a general approach for fabricating superhydrophobic materials using two components: a food-grade wax and a solvent. The methodology utilised variations in wax solubility as the solvent is exchanged, such that the resultant wax coating is rough enough to achieve superhydrophobicity. This report looks at the formulation of these coatings, and the requirements for forming highly water-repellent materials.
12:15 - 12:45	Seminar: Let's be Drastic about Plastic! Genetically Modified plastic-degrading bacteria capable of turning plastic waste into energy and high-added value products	King's College - Audit Room	Thelma González Cruz University of Glasgow	Around 7 years ago, I discovered the existence of plastic-degrading bacteria in landfills, that evolved to consume plastic, as there was nothing else to eat around. I joined a specialised Molecular Biology Lab to further study these specimens. With the advances of Genetics, eventually many more interesting applications were available to understand, modify and even improve these bacteria. Now, we can genetically modify these bacteria to turn plastic waste into high-added value products, such as alcohol for medical purposes, and other solvents or additives to make this process an economically viable way of getting rid of waste.
15:20 – 15:50	Seminar: Who cares? A multivariate insight into Mexico's overlooked care work	King's College - Audit Room	Michelle Papadakis Barradas London School of Economics and Political Science	This study examines the caregiving landscape in Mexico, particularly focusing on unpaid care work predominantly performed by women, which restricts both their personal-economic advancement and the broader economic development of Mexico. Utilising the 2022 ENASIC survey—the first comprehensive attempt to map the sociodemographic profiles of caregivers—the research aims to shed light on who is providing care and the conditions under which this care is provided. The aim is to facilitate strategic planning for social support systems that can be integrated into broader efforts to advance gender equality and stimulate economic growth, acknowledging caregiving's critical role in the social and economic framework.
16:00 – 16:30	Seminar: Leveraging EdTech for Women's Leadership Development	King's College - Audit Room	Grecia Pérez Calderón London School of Economics and Political Science	This research aims to explore the potential of Educational Technology (EdTech) as a means to enhance access to leadership training for women in Mexico. The study has three primary objectives. Firstly, it seeks to delineate the current landscape of leadership development opportunities while identifying the barriers hindering women's access to such programs. Secondly, it aims to identify which segment of women is most inclined to embrace EdTech-based leadership training, laying the groundwork for its economic viability and sustained societal impact. Lastly, it uncovers gaps and opportunities for innovation in EdTech solutions tailored to the unique needs of women leaders.

16:35 – 17:05	Seminar: A framework for generation and supply of green hydrogen to Europe from North Africa (Applied to Mexico)	King's College - Audit Room	María Guadalupe Rodríguez Vega University of Nottingham	This ongoing research project proposes the design of a structure for the production and export of green hydrogen from North Africa, specifically from Algeria to Spain. However, it is considered that the methodology to follow can be used to apply it in Mexico, especially in technical evaluation.Based on the Paris agreement, the urgency of decarbonising the energy sector points to the need to switch to renewable fuels. The research focuses on proposing different scenarios where the installed capacity to produce energy from renewable sources is evaluated in the places where it is most strategic.
17:10 – 17:40	Seminar: Harnessing Geothermal Energy for Sustainable Development in Mexico	King's College - Audit Room	César Rivas Robert Gordon University	Mexico has enormous untapped potential for geothermal energy, but it remains largely unexplored and underutilised. My presentation explores the opportunity that geothermal energy presents to drive Mexico's transition towards a sustainable energy future and reduce its dependence on fossil fuels. By leveraging the ongoing efforts of the Mexican Center for Geothermal Energy Innovation (CeMIEGeo) in mapping geothermal gradients and heat flow across the country, it is demonstrated that approximately 60% of Mexico's territory is suitable for geothermal exploitation.
18:00 – 19:00	Conference: FOUND Project: interpreting nature to find those we are missing	Judge Business School - Lecture Theatre 1	José Luis Silván CentroGeo Tunuari Chávez Government of Jalisco Daniel Nájera Betancourt Director of FOUND documentary Miguel Moctezuma University of Oxford	Disappearances are one of the most critical issues in Mexico. There are currently 116,000 individuals reported missing – to put this number in perspective, it's equivalent to the full capacity of Wembley Stadium in the UK, including the grass pitch. The impact on their families is enormous. 80% of these 116,000 individuals have disappeared since 2006, coinciding with the declaration of the war on drugs by Mexican authorities. The Jalisco search protocol is unique as it integrates technology to analyse search areas and locate clandestine graves using drones, sensors, and multispectral cameras. The team has produced a documentary and is editing a book that summarises their findings in Jalisco, illustrating how families and technology are working together.

Wednesday May 29th 2024

Hour	Event	Venue	Participants	Abstract
09:30 - 10:30	Conference: *Five reasons Mexico needs an industrial innovation strategy now*	Judge Business School - Lecture Theatre 3	Carlos López Gómez University of Cambridge (ifm)	As Mexico prepares for its imminent presidential elections, there is a need to devise an industrial innovation strategy as a national priority. Mexico has recently become one of the largest recipients of industrial foreign direct investment in the world. But this time needs to be different. Instead of specialising in basic processing and low value-added industries, Mexico needs to start competing in the race to the top. This means upgrading existing sectors with new technologies and attracting more specialised industrial activities. A new national industrial innovation strategy is required to build strong connections between Mexico's industries, applied technology R&D, and its specialised workforce.
11:00 - 11:30	Seminar: International cooperation between Mexico and Japan to mitigate catastrophic earthquakes, tsunamis and other natural phenomena.	Alison Richard Building S2	Francisco Javier Nicolás Féliz University of Oxford	Japan and Mexico, due to their shared geological characteristics, are prone to experience large earthquakes. Despite this similarity, there is a lack of knowledge about the international cooperation that has been implemented and benefited both countries in the study of oceanic plates, mathematical tsunami modelling and human resources training. This study analyses the cooperation between Japan and Mexico in disaster risk reduction, from Japan's donation of the National Disaster Centre in 1990 to joint scientific research projects on tsunami modelling in the Mexican Pacific. The concrete results and benefits of this collaboration are examined.
11:35 - 12:05	Seminar: Unravelling Nature's Circular System: Towards a Climate-Smart Village Model for a Just Sustainability Transformation	Alison Richard Building S2	Judith Magdalena Aguilar Castellanos University College London	Our reliance on fossil fuels and the 'growth at all costs' linear economic model has trapped us in a vicious circle of addiction to growth. So why have we constructed a linear system rather than embracing nature's circularity? Wetland ecosystems are among the most important ecosystems on our planet, playing a crucial role in carbon sequestration, biodiversity, and benefits to rural villages in terms of prosperity, livelihood, food security, and coastal protection. This research proposes a climate-smart village model

				through sustainable innovations and humanitarian technology adopting a circular bioeconomy for a just sustainability transformation by 2050.
12:10 - 12:40	Seminar: Safety & Health at work: The urgency of unifying treatment of biological hazards	Alison Richard Building S2	Pilar Avendaño Antunez University of Edinburgh Bruno Alejandro Orsatti Sánchez University of Strathclyde	Every day 1,000 people die from occupational accidents and a further 6,500 from work-related diseases (ILO, 2021). On work exposure to biological hazards specifically, in 2021 only, 550,000 fatalities were estimated in the world, but numbers are expected to be low as this is one of the least registered and monitored topics on national profiles (WHO, 2013). It is critical to contribute to a global decline in the number of occupational deaths, injuries, and diseases that would directly affect the reduction in related socioeconomic costs, inequalities gaps, and vulnerabilities towards climate change.
13:30 - 14:00	Seminar: A gamified virtual reality home-based neurorehabilitation as an alternative to high-cost conventional physiotherapies	Alison Richard Building - room 119	Bruno Alejandro Orsatti Sánchez / Pilar Avendaño Antunez	Virtual reality technology is an effective tool of neurorehabilitation complementary to conventional therapies, which promotes functional improvement in patients with neurological conditions both in the clinic and at home. The analysis demonstrates that game-based therapies could achieve functional, motor, balance, and psycho-emotional health improvement with positive effects on motivation, self-confidence, commitment, and active participation from patients. Based on the Sociology of Expectations and Technology design and use, a particular focus is given to the technologies on lower income patients as the technology approach makes high-cost therapies more accessible and efficient, as well as to have a wider coverage for patients in remote communities.
14:05 – 14:35	Seminar: Investing in Deep-tech Startups in Mexico: Leveraging Nearshoring for Growth and Innovation	Alison Richard Building - room 119	Montserrat Vega University of Manchester	Despite these advancements, Mexican tech startups face several challenges, including insufficient funding compared to other global markets, a shortage of technical talent, bureaucratic regulatory frameworks, and underdeveloped technological infrastructure. Additionally, fostering a culture of innovation remains a significant hurdle. Nearshoring, the relocation of business processes to nearby countries, presents a substantial opportunity for Mexico's tech startup ecosystem. The country's proximity to the United States makes it an attractive destination for foreign direct investment, offering startups easier access to North American markets.
14:30 – 15:00	Seminar: mRNA vaccines for diseases transmitted by arthropods	King's College - Audit Room	Alejandro Diaz Hernandez University of Oxford	Arthropod-borne diseases have increased dramatically in recent decades, introducing pathogens to domestic animals, wildlife and humans. The mRNA technology represents an attractive opportunity as a therapeutic platform in vaccines, due to its rapidity, effectiveness, and versatility, positioning it as the ideal option in the search for alternatives against infectious diseases.

				Currently, there is only one approved mRNA vaccine, however, research in the area during the last three years has grown exponentially in academia and industry. This project seeks to push the limits of current mRNA technology by modifying the sequences for better regulation, translation and half-life. It also aims to reduce costs by using patent-free lipid nanoparticles produced more economically.
15:05 – 15:35	Seminar: Developing a 3D Microvasculature Construct for Traumatic Injury Research	King's College - Audit Room	Carla Verónica Fuenteslopez University of Oxford	Microvascular injuries can have systemic physiological effects that exacerbate other injuries and pose a danger to life. In vitro microvascular models are required to gain further understanding of traumatic injuries and, to that end, this research aims to develop and optimise a 3D hydrogel scaffold for the formation and long-term integrity of an in vitro microvasculature for trauma research. First, we explore hydrogel constructs created with a range of polymers, solvents, and concentrations. The suitability of such constructs was systematically evaluated to identify the optimal composition in terms of cell proliferation, adhesion, migration rate, viability, hydrogel consistency and shape retention, and tube formation.
15:40 – 16:10	Seminar: D-ALPS: A Non-Reversible Sampler for Multimodal Distributions	King's College - Audit Room	Fernando Antonio Zepeda Herrera University of Warwick	In modern statistics, a common task is to use Markov Chain Monte Carlo methods to sample from specific probability distributions implied by the researcher's model. However, when the target is multimodal in the sense of having regions of high probability separated by valleys of low probability, off-the-shelf algorithms like Hamiltonian Monte Carlo or Random Walk Metropolis may get trapped in one of the modal regions for long periods of time, rendering them ineffective and potentially invalidating inferences. Tempering methodology has been designed to remedy this situation; in particular, the Annealed Leap-Point Sampler (Tawn et al, 2021) is a novel algorithm that leverages modal information to accelerate jumps between modes. Here we present D-ALPS, a Non-Reversible extension of it based on the Deterministically alternating swapping scheme of Okabe et al (2001).
18:00 - 20:00	Closure Social Drinks (Covered by assistants)	The Granta	N/A	