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## SHORT TERM MISSIONS

Short Term Missions (STMs) are small travel grants with the aim of:

- Sharing scientific expertise, methodologies, equipment and facilities to harmonise the existing approaches and methodologies within the large
- OHEJP European network  
Driving the research forward in a collaborative and non-duplicative fashion to strengthen both the scientific capacity within the OHEJP
- Contributing to the future prevention, preparedness, detection and response of the EU to foodborne and other emerging threats across human-animal-environmental sectors.

## CarbaPlasmid – Tracking endemic carbapenemase plasmids in human, animal and environmental isolates



**Theme:** One Health, AMR  
**Home Institute:** [NUI Galway](#), Ireland  
**Mission Hosting Institute:** [VISAVET](#), Universidad Complutense Madrid, Spain  
**Duration of Mission:** 1 month

The aim of this mission was to develop skills in nanopore sequencing and hybrid sequence analysis in order to characterise antimicrobial resistance plasmids for One Health epidemiological investigations.

In this project, Carbapenemase-producing Enterobacterales (CPE) isolated from the natural environment, hospital wastewater, the hospital environment and hospital patients in Galway, Ireland, were analysed by hybrid sequencing analysis. Several techniques and applications for analysis of hybrid bacterial sequence data were learned. A harmonised hybrid sequence analysis pipeline was successfully transferred between One Health EJP partners Universidad Complutense Madrid (UCA) and NUI Galway.

This short term mission developed capacity for long-read sequencing and hybrid sequence assembly in Irish OHEJP partner NUI Galway, which will also be used to support the surveillance function of the Irish National CPE Reference Laboratory. This expertise will be fundamental in ongoing and future collaborative AMR research projects with OHEJP partners and in the surveillance of endemic carbapenemase plasmids in a One-Health context in Ireland.

The data will contribute to bridging the knowledge gaps that exist in our understanding of the role of the environment in the persistence, evolution and transmission of AMR plasmids and the propensity for carbapenemase plasmid transfer between different bacterial species and strains in distinct ecological niches. It may also identify emerging AMR threats from a One Health perspective.

The training and harmonisation elements of the STM were successful, resulting in successful training of Dr Burke in nanopore sequencing and hybrid sequence analysis methodology and transfer of the protocol to his home Institution. The research outcome of the STM was also highly successful, resulting in 39 complete hybrid-assembled CPE genomes including 38 fully circularised CPE plasmids. Further analysis will result in a high quality scientific publication. Furthermore, the STM has strengthened links between NUI Galway's ARME lab and UCM's ARU lab, paving the way for further One Health collaborative research on antimicrobial resistance.

One Health EJP has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 773830.

***This STM allowed me to learn cutting edge techniques in bacterial sequence analysis, which will greatly benefit researchers within my lab and our collaborators. I had an amazing experience in Madrid: everyone at the ARU made me feel like one of the team! This mission has paved the way for further scientific collaboration and intercultural opportunities..."***

Liam Burke,  
NUI Galway

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