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## **Cooking with Gas: Can Anaerobic Digestion Reduce the Prevalence of Antimicrobial Resistance in Cow Manures and Slurries?**

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**Host institution:** University of Nottingham

### **Project description:**

There are almost 1.9 million dairy cows in the UK and many of these are housed indoors and given antibiotics when they are sick. Dung, urine and floor washings are usually stored in slurry tanks or lagoons until spread onto fields as a fertiliser. But within that mixture are also millions of bacteria and residual antibiotics excreted by treated cows. This organic 'soup' is the ideal setting for horizontal gene transfer between bacteria, resulting in possible proliferation of antibiotic resistance. When the slurry is spread onto soil, antibiotic residues and antibiotic resistant bacteria may enter the agroecosystem. Many farmers use their slurry to produce bioenergy *via* anaerobic digestion. The aim of this project is to determine if anaerobic digestion reduces the number of antibiotic resistant bacteria and antibiotic resistance genes within the slurry. Laboratory-scale anaerobic digestion trials will be carried out and the slurry tested for antibiotic resistant bacteria and resistance genes before and after digestion. The data obtained from classical and metagenomics techniques will be used to fit a mathematical model to infer rates of change with their uncertainty to inform slurry management options and reduce inputs of antibiotic resistant bacteria and/or genes into areas of food production. We will develop ordinary differential equation models in the first instance and use Approximate Bayesian Computation to infer parameters and their uncertainty. The successful candidate will be embedded in the BBSRC Doctoral Training Partnership at Nottingham which will provide additional training opportunities and local student cohort activities.

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Please give the **project title and name of the main supervisor**. You do not need to provide a research proposal as requested on the form; instead indicate that you are applying for a **Medical Research Foundation National PhD Training Programme in AMR Research** funded project. For informal enquiries or help with the application, please contact [helen.west@nottingham.ac.uk](mailto:helen.west@nottingham.ac.uk)