

## Quantification and mitigation of agricultural methane emissions

*Dr Rebecca Fisher (RHUL), Dr James France (RHUL, Environmental Defense Fund), Dr David Lowry (RHUL)*

[r.e.fisher@rhul.ac.uk](mailto:r.e.fisher@rhul.ac.uk)

### Background

Global atmospheric methane concentrations are at record levels and continue to rise. The Global Methane Pledge has now been signed by 150 countries, who have pledged to cut global methane emissions by 30% by 2030. This is an immense challenge and to do this policy makers need better information of exactly where emissions are located and the quantities being emitted. Globally livestock emissions from manure and gastroenteric releases are responsible for around a third of human caused methane emissions. With population growth and increased food demand emissions from the agricultural sector are growing, thus jeopardising the success of both the Global Methane Pledge and the Paris Agreement. Mobile measurements of methane, and other tracers such as methane isotopes, carbon dioxide, ammonia and ethane can locate and identify sources. Recent work by Royal Holloway identified many targets within the UK for methane reduction, very large emissions from biogas and agricultural waste management. Development and demonstration of reliable methodologies for cost-effective quantification of these sources are fundamental for construction of meaningful regulatory frameworks.

### Methodology and training

You will make mobile measurements (by car and UAV) around farms and farm-fed biogas facilities to map methane and develop modelling methods to quantify emissions and identify opportunities for methane reduction. Work will consider how these methodologies are translated to developing nations to allow more detailed understanding of agricultural methane emission factors.

### Training

You will be trained in atmospheric measurements in the Greenhouse Gas laboratory at Royal Holloway and in UAV flying using Royal Holloway's Omnidrome facility. Training will be available in coding, data analysis, plume modelling and emissions quantification. The student will join a research group with long experience in greenhouse gas measurement and collaborations with the UK and global greenhouse gas community.

### Person specification

A numerate individual interested in atmospheric science and in carrying out field and laboratory measurements and analysis of data. Degrees could be in Physics, Chemistry, Biology, Earth Sciences, Environmental Sciences, Engineering or other related disciplines.

### References

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- 4) France, J. L., Lunt, M. F., Andrade, M., Moreno, I., Ganesan, A. L., Lachlan-Cope, T., Fisher, R. E., Lowry, D., Parker, R. J., Nisbet, E. G., & Jones, A. E. (2022). Very large fluxes of methane measured above Bolivian seasonal wetlands. *Proceedings of the National Academy of Sciences of the United States of America*, 119(32), [e2206345119]. <https://doi.org/10.1073/pnas.2206345119>.
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## Key Information

- This project has been shortlisted for funding by the ARIES NERC DTP and will start on 1st October 2024. The closing date for applications is 23:59 on 10th January 2024.
- Successful candidates who meet UKRI's eligibility criteria will be awarded a NERC studentship, which covers fees, stipend (£18,622 p.a. plus London Weighting for 2023–24) and research funding. International applicants are eligible for fully-funded ARIES studentships including fees. Please note however that ARIES funding does not cover additional costs associated with relocation to, and living in, the UK. We expect to award between 4 and 6 studentships to international candidates in 2024.
- ARIES students benefit from bespoke graduate training and ARIES provides £2,500 to every student for access to external training, travel and conferences, on top of all Research Costs associated with the project. Excellent applicants from quantitative disciplines with limited experience in environmental sciences may be considered for an additional 3-month stipend to take advanced-level courses.
- ARIES is committed to equality, diversity, widening participation and inclusion in all areas of its operation. We encourage enquiries and applications from all sections of the community regardless of gender, ethnicity, disability, age, sexual orientation and transgender status. Academic qualifications are considered alongside non-academic experience, and our recruitment process considers potential with the same weighting as past experience.
- All ARIES studentships may be undertaken on a part-time or full-time basis, visa requirements notwithstanding.
- For further information, please contact the supervisor. To apply for this Studentship follow the instructions at the bottom of the page or click the 'apply now' link.
- ARIES is required by our funders to collect Equality and Diversity Information from all of our applicants. The information you provide will be used solely for monitoring and statistical purposes; it will remain confidential and will be stored on the UEA sharepoint server. Data

## Competition-funded NERC PhD project



will not be shared with those involved in making decisions on the award of Studentships, and will have no influence on the success of your application. It will only be shared outside of this group in an anonymised and aggregated form. You will be asked to complete the form by the University to which you apply.

- ARIES funding is subject to UKRI terms and conditions. Postgraduate Researchers are expected to live within reasonable distance of their host organisation for the duration of their studentship. See <https://www.ukri.org/publications/terms-and-conditions-for-training-funding/> for more information.