中国科学院武汉岩土力学研究所
Institute of Rock and Soil Mechanics,Chinese Academy of Sciences

岩土力学与工程前沿讲坛

Forum on Geomechanics and Geo-engineering

No.SKL*2025-30*

应岩土力学与工程安全全国重点实验室邀请，英国爱丁堡大学 Katriona Edlmann 教授来访交流并做学术报告，报告信息如下：

报告人 Lecturer	**Professor Katriona Edlmann**
讲座题目 Theme	**Underground Hydrogen Storage: Global Progress and Technical Realities**
报告时间 Time	**2025 年 11 月 3 日（周一）上午 9:30**
报告地点 Spot	**武汉岩土所研发大楼 12 楼学术交流室**
邀请人 Inv. by	**刘建军 研究员 油气地下储备与开发研究中心**

欢迎广大科研人员及研究生参加！

岩土力学与工程安全全国重点实验室
State Key Laboratory of Geomechanics and Geotechnical Engineering Safety

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报告简介

Underground hydrogen storage (UHS) is emerging as a cornerstone of the energy transition, enabling large-scale, long-duration energy storage and providing flexibility to future low-carbon energy systems. For hydrogen to be deployed at the scales required for net zero, we will need access to large-scale geological storage. Europe is leading international efforts to deploy UHS, with multiple field pilots now operating across salt caverns, depleted gas reservoirs, and lined rock caverns. This talk will provide an overview of the current status of UHS development in Europe, with a particular focus on storage in porous media. Drawing on results from recent research and demonstration projects, it will discuss advances in our understanding of hydrogen flow dynamics, recovery efficiencies, material and well integrity, and the role of geo-microbiological processes during injection–withdrawal cycles. The presentation will also outline ongoing research at the University of Edinburgh, including experimental and modelling studies designed to quantify the coupled thermal, hydraulic, mechanical, chemical, and biological (THMCB) processes that control the safe and efficient operation of UHS in porous formations.

地下储氢（UHS）正逐渐成为能源转型的基石，它能够实现大规模、长时间的能源储存，并为未来的低碳能源系统提供灵活性。要使氢气的使用规模达到实现净零排放的要求，我们需要利用大规模的地质储存设施。欧洲在推动地下储氢应用方面处于国际领先地位，目前在盐穴、枯竭气藏和衬砌岩洞等多种场所开展了多个实地试点项目。本次演讲将概述欧洲地下储氢发展的现状，特别关注多孔介质中的储存情况。演讲将结合近期研究和示范项目的成果，探讨我们在氢气流动动力学、回收效率、材料和井筒完整性，以及注采循环过程中地质微生物过程的作用等方面的认识进展。演讲还将介绍爱丁堡大学正在进行的研究，包括旨在量化控制多孔地层中地下储氢安全高效运行的热、水、力、化学和生物（THMCB）耦合过程的实验和模拟研究。

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报告人介绍

Name pronunciation for info: Kat-ri-o-na E-dl-mann

Professor Katriona Edlmann holds a personal Chair of Sustainable Energy at The University of Edinburgh. Katriona has over 25 years' experience researching the secure and sustainable utilisation of the subsurface for low-carbon energy applications including hydrogen energy, carbon dioxide, compressed air and thermal energy storage.

Katriona studied Petroleum Geology at Aberdeen University before undertaking her master's degree and PhD in Petroleum Reservoir Engineering at Heriot-Watt University.

Katriona leads multiple UKRI, EU and industry funded projects focused on underground hydrogen storage technologies. Katriona is a member of the UK Government Department for Energy Security and Net Zero Hydrogen Advisory Council Transportation and Storage Infrastructure Working Group and is sub-task lead on the International Energy Agency Technology Collaboration Programme task 42: Underground Hydrogen Storage and contributor to Task 49: Natural Hydrogen.

卡特里奥娜•埃德尔曼教授在爱丁堡大学担任可持续能源领域讲席教授。卡特里奥娜拥有超过 25 年的研究经验，致力于研究地下空间在低碳能源应用中的安全可持续利用，这些应用包括氢能、二氧化碳、压缩空气和热能储存等。

卡特里奥娜曾在阿伯丁大学学习石油地质学，之后在赫瑞-瓦特大学攻读石油储层工程硕士学位和博士学位。

卡特里奥娜牵头开展了多个由英国研究与创新署（UKRI）、欧盟以及行业资助的项目，这些项目聚焦于地下储氢技术。卡特里奥娜是英国政府能源安全与净零排放部氢能咨询委员会运输与储存基础设施工作组的成员，也是国际能源署技术合作计划第 42 项任务“地下储氢”的子任务负责人，还是第 49 项任务“天然氢”的贡献者。