Contribution ID: **1053** Type: **Oral Presentation**

Super-resolution imaging of multiphase fluid distributions in porous media using deep learning

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X-ray imaging has become an indispensable tool in the study of porous media, significantly enhancing our understanding of multiphase flow within these pore structures. High-resolution X-ray images enable researchers to accurately measure or calculate critical rock properties such as porosity, interfacial surface area, curvature, and contact angle distributions. These images are also pivotal in determining capillary pressure from local interfacial curvatures. Achieving high-resolution images with a large field of view (FOV) is crucial for obtaining accurate and representative geometrical and physical properties, yet balancing FOV with resolution remains a formidable challenge. Recently, super-resolution imaging techniques using deep learning have demonstrated considerable potential in addressing this issue. We have successfully implemented an Enhanced Deep Super-Resolution (EDSR)-based method on multiphase flow images, which produced high-resolution results while expanding the FOV. A rigorous comparison with ground truth confirms that our super-resolution outcomes are consistent with the ground truth. This breakthrough is particularly significant as it provides more detailed and expansive insights into fluid behaviour in porous media, thereby paving the way for future advancements in geological research and practical applications.

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Primary author: MA, Zhuangzhuang

Co-authors: BIJELJIC, Branko (Imperial College); WEN, Gege (Stanford University); TANG, Kunning (UNSW); BLUNT, Martin (Imperial College London); GAO, Yang (Dr)

Presenter: MA, Zhuangzhuang

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