



# PREDICTIVE DIGITAL TWIN OF GEOLOGIC CO<sub>2</sub> STORAGE AND PLUME EVOLUTION

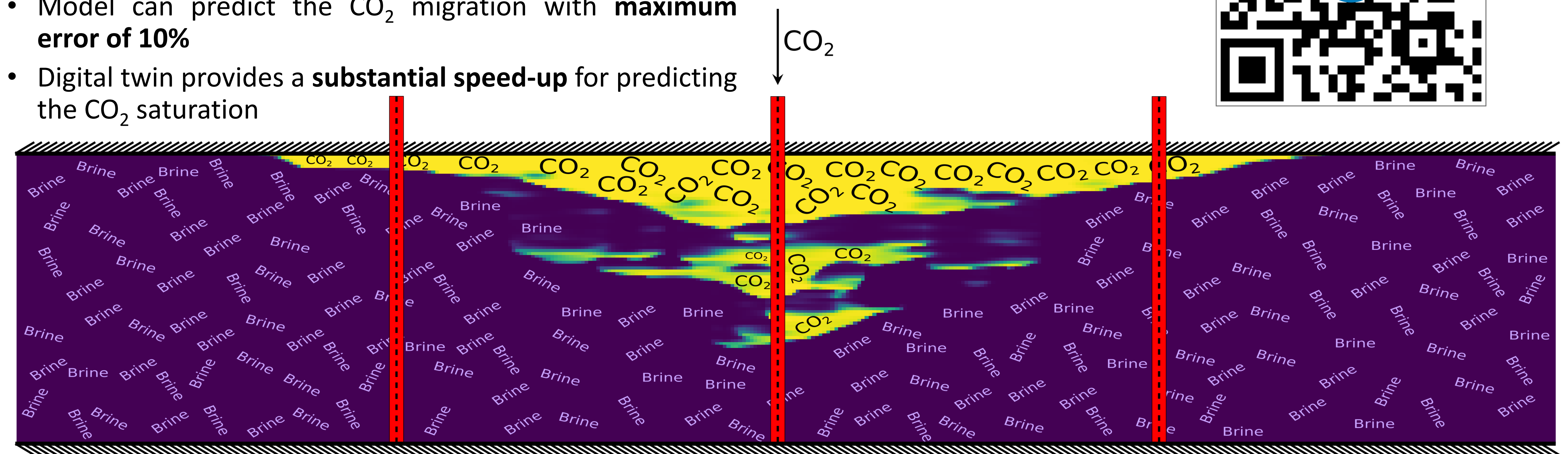
Carlos A. S. Ferreira<sup>a</sup>, Michal Stepien<sup>a</sup>, Seyedbehzad Hosseinzadehsadati<sup>a</sup>, Teeratorn Kadeethum<sup>b</sup>, Hamidreza M. Nick<sup>a</sup>

<sup>a</sup>Danish Offshore Technology Centre, Technical University of Denmark, Kgs. Lyngby, Denmark

<sup>b</sup>Sandia National Laboratories, Albuquerque, New Mexico, USA

## Highlights

- Digital twin maps **well data** to **CO<sub>2</sub> saturation** distribution
- Model can predict the CO<sub>2</sub> migration with **maximum error of 10%**
- Digital twin provides a **substantial speed-up** for predicting the CO<sub>2</sub> saturation



## Methodology

- Employ continuous **conditional generative adversarial networks (CCGANs, Teeratorn et al. (2022, Computers & Geosciences))** for predicting the saturation distribution of CO<sub>2</sub> given porosity, average pressure and injection rate in three wells
- Train/test with synthetic data generated with Eclipse 100
- Scenario: injection over 10 years and monitoring over 20 more years

## Results

