

2023 ARMA Future Leader Webinar Series

Every Two Weeks on Fridays 9-10 AM MT



13th lecture: September 15, 2023

Please reach out to shahrzad.roshankhah@utah.edu to get the Zoom meeting information.

Speaker: Teeratorn Kadeethum

Title & Abstract:

Understanding Geological Carbon Storage through Light-weight Production-ready Machine Learning Frameworks

Geological carbon and energy storage are pivotal in achieving a carbon-neutral economy. Nevertheless, the execution of geological storage operations confronts various uncertainties, encompassing geological configurations and operational constraints. These uncertainties can trigger issues such as induced seismic events or contamination of groundwater resources. Applying machine learning (ML) algorithms presents a promising avenue for optimizing these operations and mitigating such concerns. Nonetheless, ML-driven strategies for subsurface physics encounter several challenges: Substantial computational resources are necessitated for large-scale analyses. ML models tailored to one specific site need more generalizability to other locations. There needs to be an adequate emphasis on establishing a comprehensive end-to-end framework. This presentation will systematically delve into each facet of an idealized end-to-end ML framework to enhance comprehension of geological storage operations. The framework strives to strike a balance by ensuring computational efficiency and portability across various storage sites and encompassing the complete life cycle of machine learning processes. SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525.

Biography:

Teeratorn Kadeethum earned a B.Eng. in mechanical engineering from Chulalongkorn University, Thailand (2007), an M.Sc. in chemical engineering from the University of Calgary, AB, Canada (2016), and a Ph.D. in applied mathematics and computer science from the Technical University of Denmark (2020). He served as a postdoctoral associate in mechanical and aerospace engineering at Cornell University, NY, USA (2020-2021), and currently holds a postdoctoral role at the climate change security center at Sandia National Laboratories, NM, USA. He has four years of industrial experience as a reservoir engineer at PTT Exploration and Production, an international oil company. He has authored 20+ research articles. His scholarly focus includes scientific machine learning, higher-order finite element approximations, and model order reduction for nonlinear partial differential equations.

