Stanford
School of Earth, Energy & Environmental Resources

Stanford Center For Carbon Storage

December 2021

Greetings!

We hope that our fall newsletter finds you all well.

The Stanford Center for Carbon Storage (SCCS) affiliates meeting was a major success. Due to the ongoing Covid situation, a late minute decision was made to hold the event virtually. All 3 sessions were exceptionally well attended and showcased 19 different research projects. Links to the webinar recordings can be found here, and a pdf containing a one-slide summary of each research project can be found here.

As many of you know, Sally Benson, co-director of SCCS has recently been named the Deputy Director for Energy at the White House Office of Science and Technology Policy. She will be the Chief Strategist for the energy transition. An announcement can be found here. This is a great opportunity for Sally and wonderful news for the country.

SCCS welcomes Professor Lou Durlofsky, as a new co-director of SCCS. Lou is a professor in the Department of Energy Resources Engineering. His research focuses on modeling, optimization, and history matching of subsurface flow processes (oil/gas production and CO2 storage) and on the development of fast surrogate models to enable these computations.

Thanks to everyone for your continued support of our program and welcome our newest member, Ecopetrol.

A summary of recent activities and publications can be found below.

Sarah Saltzer, SCCS Managing Director

Recent Events

Gege Wen, a PhD student in the department of Energy Resources Engineering at Stanford spoke at the SCCS seminar series on Oct 6, 2021. This webinar introduced the brand new **CCSNet.ai** web application, which provides instantaneous modeling predictions for CO2 storage problems. Recording & CCSNet.ai tool download here

Sarah Saltzer delivered a keynote presentation to the Asociación Colombiana Geólogos y Geofísicos del Petróleo on Oct 26, 2021 entitled “Carbon Capture and Storage – Why it is needed to get to net zero”. Link to youtube video here

Eric Trusiewicz, Fellow at Stanford Steyer-Taylor Center for Energy Policy & Finance spoke at the SCCS seminar series on Oct 27, 2021. The title of his talk was “Cement and Concrete Decarbonization”. Presentation slides here

Mark Zoback, Professor Emeritus and co-director of SCCS is a SEG 2021 North America SEG Honorary Lecturer. He presented a talk on “Geomechanical Issues Affecting Long-Term Storage of CO2” on Nov 4, 2021. Recording here.

Recent Publications

Baik, E., Chawla, K., Jenkins, J., Kolster, C., Patankar, N., Olson, A., Benson, S., & Long, J. (2021). **What is different about different net-zero carbon electricity systems?**. *Energy and Climate Change*, *2*, 100046. https://doi.org/10.1016/j.egycc.2021.100046

Anderson, T., Vega, B., McKinzie, J., Aryana, S., & Kovscek, A. (2021). **2D-to-3D image translation of complex nanoporous volumes using generative networks**. *Scientific Reports*, *11*, 20768 . https://doi.org/10.1038/s41598-021-00080-5

Wen, G., Li, Z., Azizzadenesheli, K., Anandkumar, A., & Benson, S. (2021). **U-FNO -- an enhanced Fourier neural operator based-deep learning model for multiphase flow**. https://sccs.stanford.edu/sites/g/files/sbiybj17761/files/media/file/2109.03697_0.pdf

De Paolo, D., Thomas, D., Christensen, J., Zhang, S., Orr, F., Maher, K., Benson, S., Lautze, N., Xue, Z., & Mito, S. (2021). **Opportunities for large-scale CO2 disposal in coastal marine volcanic basins based on the geology of northeast Hawaii**. *International Journal of Greenhouse Gas Control*, *110*, 103396. https://doi.org/10.1016/j.ijggc.2021.103396

Esteves, B., Lage, P., Couto, P., & Kovscek, A. (2021). **Pore-merging methodology for reactive transport and mineral dissolution in pore-network models**. *Advances in Water Resources*, *155*, 104014. https://doi.org/10.1016/j.advwatres.2021.104014

Ni, H., Møyner, O., Kurtev, K., & Benson, S. (2021). **Quantifying CO2 capillary heterogeneity trapping through macroscopic percolation simulation**. *Advances in Water Resources*, *155*, 103990. https://doi.org/10.1016/j.advwatres.2021.103990

Tang, M., Ju, X., & Durlofsky, L. (2021). **Deep-learning-based coupled flow-geomechanics surrogate model for CO2 sequestration**. https://sccs.stanford.edu/sites/g/files/sbiybj17761/files/media/file/2105.01334_0.pdf