MONet 2nd XCT Working Group meeting
Attendees (Total 16 participants): Carl, Cassandra Miller, Derek Detweiler, Garystinchcomb, Jared Lee Wilmoth, Julie Jastrow, Michael Ricketts, Phillip Owens, Rachel Berner, Ruifang Hu, Sharon Billings

- Review XCT MONet data types (Tamas)
    - Highlighting the various XCT data types collected, particularly focusing on lower resolution scans for overall core visualization and higher resolution scans for detailed porosity analysis.
    - Discussion of the data collection methods: lower resolution scans (core overview) and higher resolution scans (pore network analysis).
- Quick overview of topics discussed in the first meeting and GitHub (Tamas)
    - Meeting notes and meeting recordings available on the GitHub
- How do we do XCT segmentation? (Maruti)
    - Segmentation of XCT data
        - Focused on differentiating between solid and pore spaces.
    - Use computer vision and machine learning techniques for segmenting XCT images.
    - Showcased the Jupyter notebook workflow for segmenting and visualizing XCT data in a 3D context using tools like Paraview.
        - Important links to reference:
        - https://github.com/EMSL-MONet/XCT_Working_Groups
        - Visualizing 3D data towards modeling:
        - https://www.paraview.org/download/
        - XCT (sub-volume) Google Colab Notebook:
        - https://colab.research.google.com/drive/1Tbm49gRwDpvYKg5ukrrtfSo8yshRLil7?usp=sharing
        - Complete XCT data and associated analysis are available through Jupyter Lab notebooks.
        - Please see XCT_FullDataAnalysis_Notebook.ipynb
        - https://github.com/EMSL-MONet/CommSciMtg_Nov23/blob/main/XCT/XCT_FullDataAnalysis_Notebook.ipynb
        - Download ParaView software for visualization: https://www.paraview.org/download/
- Review Jupyter notebook workflow (Maruti)
    - How do we run PFLOTRAN workflows for analyzing bulk data and how to extend to 3D format?
    - PFLORTRAN Model focusing on C degradation
    - Use Google Colab and Jupyter Notebooks for exploring XCT data
    - FLOTRAN workflows for analyzing bulk data.
    - Overview of extension of these workflows to 3D data formats.
    - Examples of how to construct meshes for modeling purposes and provided an overview of PFLOTRAN input decks.

- Discussed the integration of chemical imaging data for advanced modeling of flow, transport, and energy balance scenarios.

- PFLOTRAN EMSL Integration
  - PFLOTRAN input files for modeling more complex reactions
  - Reaction Sandbox
  - https://www.pflotran.org/documentation/theory_guide/reaction_sandbox.html

  - Some resources to get started
  - https://bitbucket.org/pflotran/pflotran/src/master/shortcourse /
  - https://bitbucket.org/pflotran/pflotran/src/master/regression_
  - tests/default/batch /

  - PFLOTRAN developers and users at PNNL are happy to help EMSL users on using PFLOTRAN on Tahoma

  - Questions regarding PFLOTRAN installation
  - (i.e. not answered in the installation tab),
  - bug reports: pflotran-dev@googlegroups.com

  - Questions regarding running PFLOTRAN:
  - pflotran-users.googlegroups@com
  - https://groups.google.com/g/pflotran-users
  -
- Questions and discussion (All)
  - Is there a R studio workflow as well? Or with XCT data is python better?
  - Choice of thresholds for segmenting XCT images: Is 10 a good number or would we need to play around a bit with threshold?