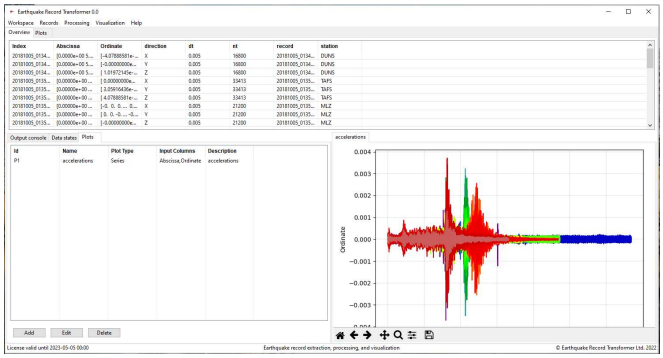
Problem Statement - Large Complex and Irregular Time-History Data Files: A problem in engineering is the parsing of large and complex data structures from a variety of heterogeneous file formats (ASCII, binary, etc.). A particularly difficult challenge is the extraction of time-history data (e.g., earthquake acceleration records from PEER or structural responses from LS-DYNA) and associated metadata, the application of subsequent processing steps (e.g., frequency filtering, windowing, etc.), and persistence of the processed time-histories as both human-readable text files and figures for interrogation and reporting. This task has not been well addressed by commercial software to date; therefore, we have developed a software program to address the problem. The main innovations and features are discussed briefly below.

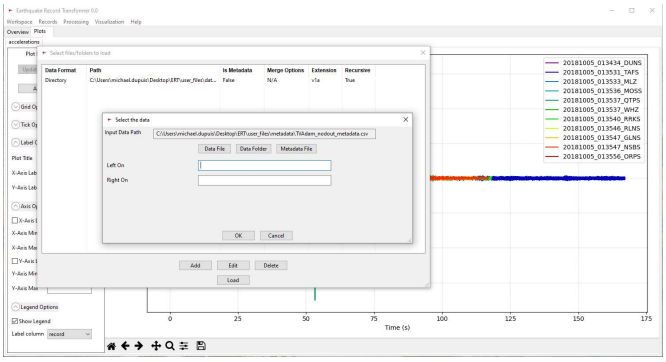
Innovation 1 - Graphical User Interface

- Flattens learning curve for new users
- Facilitates saving and loading of workspaces
- Processing steps can be saved and shared
- Packages innovations 2-4 together into a convenient and accessible workflow
    - Data Extraction and Metadata Merging
    - Collection Pipeline Workflow
    - Rapid Figure Creation



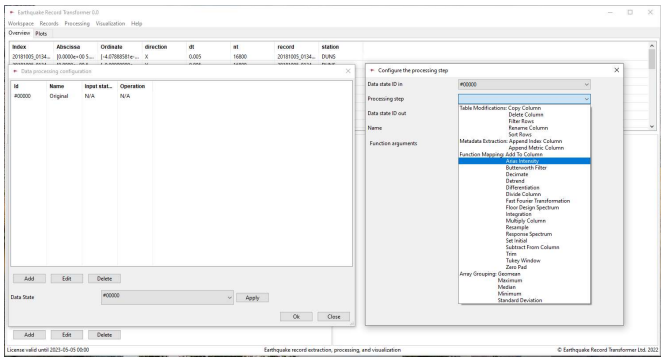
Innovation 2 - Data Extraction and Metadata Merging

- Built-in data reading algorithms based on the file extension, extracts:
    - Time-histories (TH)
    - Available metadata for each TH
- Option to merge in additional user-specified metadata from csv file, e.g.:
    - Dam block, lift joint, etc.
    - Earthquake, station, direction, etc.



Innovation 3 - Collection Pipeline Workflow

- Built-in post-processing procedures (30 total):
    - Signal processing functions
        - FFT, RSA, FDS, freq. filt. etc.
    - Table filtering
        - Remove rows and columns
    - Intensity metric extraction
    - Grouping operations
        - Median, geomean, max, etc.



Innovation 4 - Rapid Figure Creation

- Built-in figure creation using processed time-histories and metadata at each processing step
- Explicit control of figure elements
    - Axis scale (linear or log)
    - Axis limits, gridlines, and ticks
    - Figure, axis, and line labels
- Manual zooming, panning, and saving of figures