

EBCC Data Analysis Tool (EBCC DAT)

Project Goals

- Develop a tool for working with eyeblink conditioning data
- Focus on data visualization
- Dealing with evolving requirements
- Ultimately, EBCC DAT centered on three key features:
 - Visualize single data sets
 - Visualize groups of data sets
 - Compute dependent measures from trials

Visualization Requirements

- 2D rendering of single trials
- 3D rendering of multiple trials in one dataset
- 3D rendering of multiple datasets, each dataset represented by a single average waveform

Data Processing Requirements

- The need to compute numerical measures from the data necessitated an update to the requirements
- EBCC DAT became an application for data analysis as well as data visualization
- Excel-style formulas were utilized in defining measures to be computed
- Summaries for trials had to be saved as Excel spreadsheets

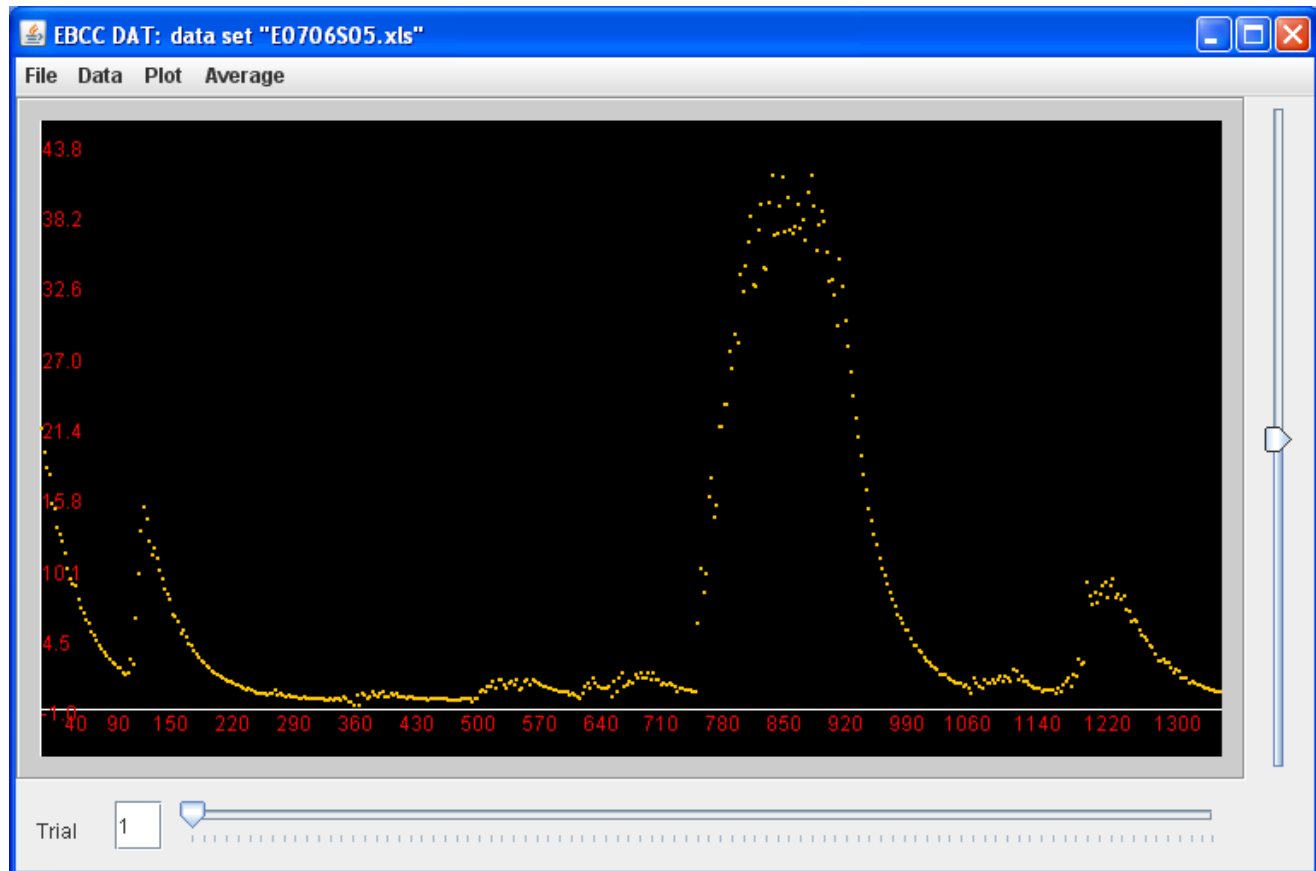
Approach

- Design split into 5 parts:
 1. User Interface
 2. Graphics Framework
 3. Measures Framework
 4. Data Model
 5. IO Model

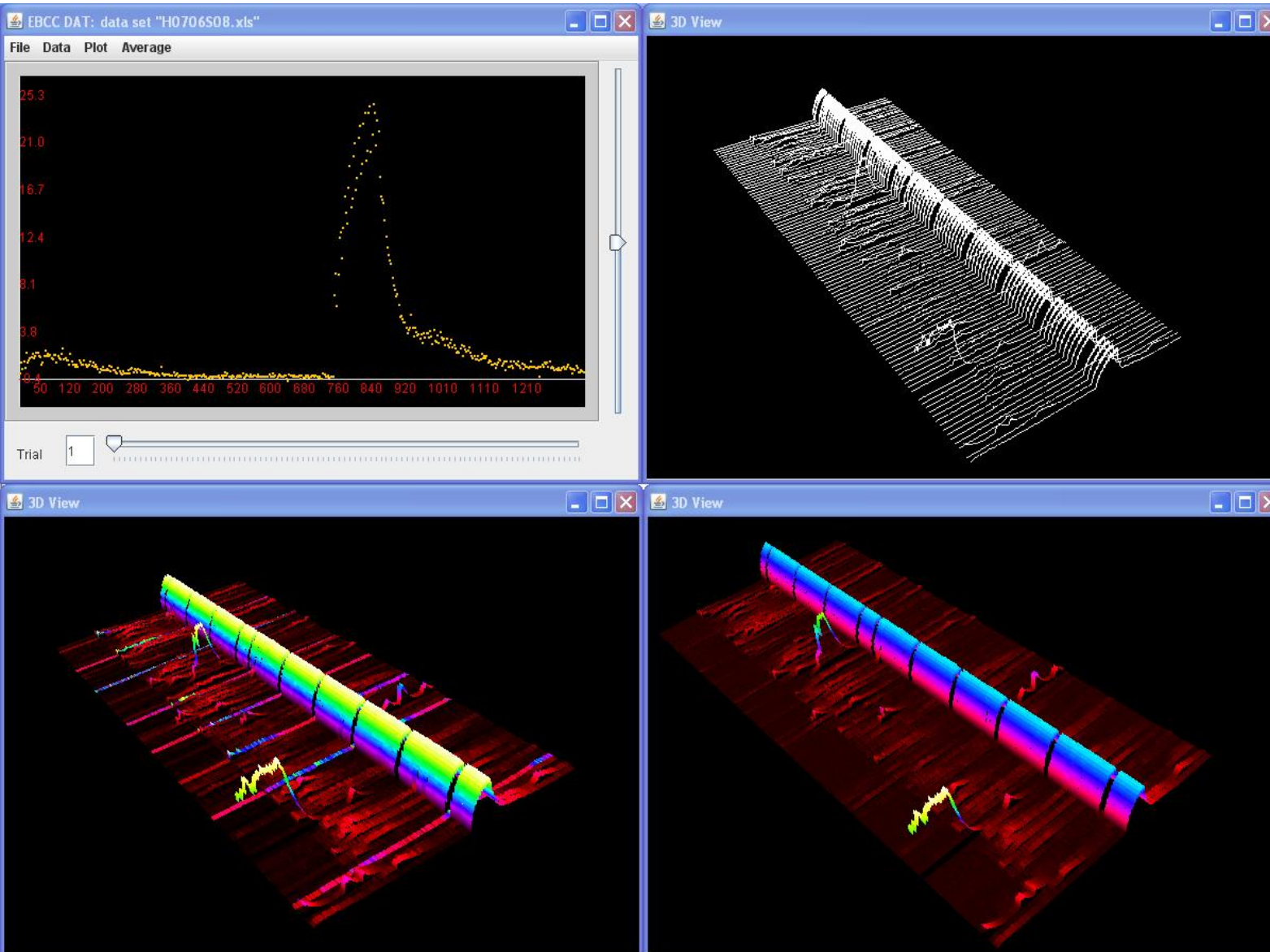
- Continuous collaboration with Mike Tobia and Kevin Brown working in Dr. Woodruff-Pak's lab to determine and refine the requirements.
- Iterative development
- Testing by comparing results with existing software

Results

- Two dimensional visualization



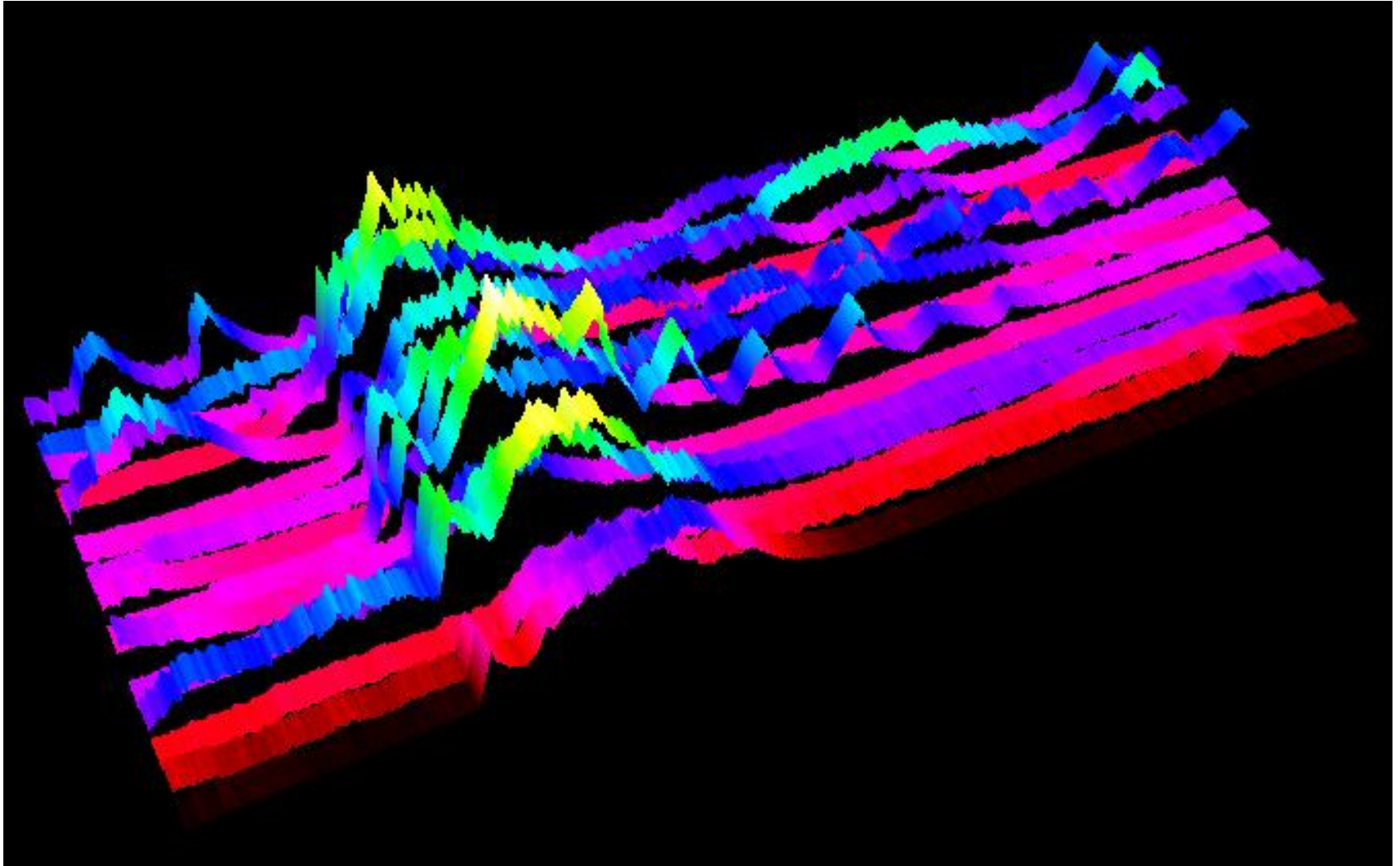
- 3D visualization of one dataset



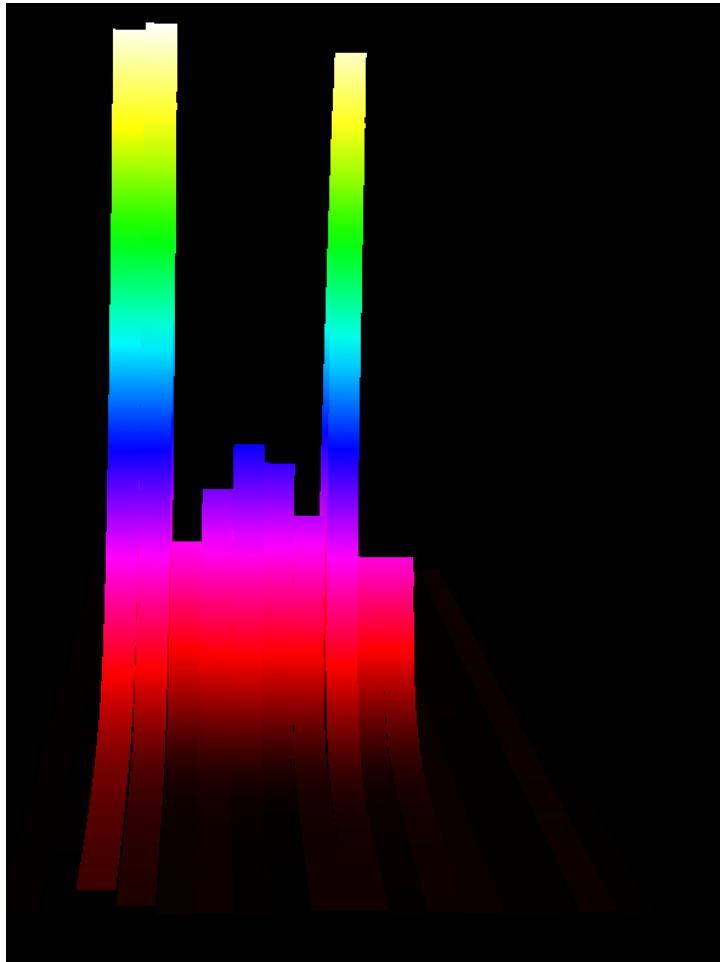
EBCC DAT Interface, displaying the same mouse dataset in four views:

- 2D plot of the first trial
- 3D line view
- 3D topographic relative view (left)
- 3D topographic absolute view (right).

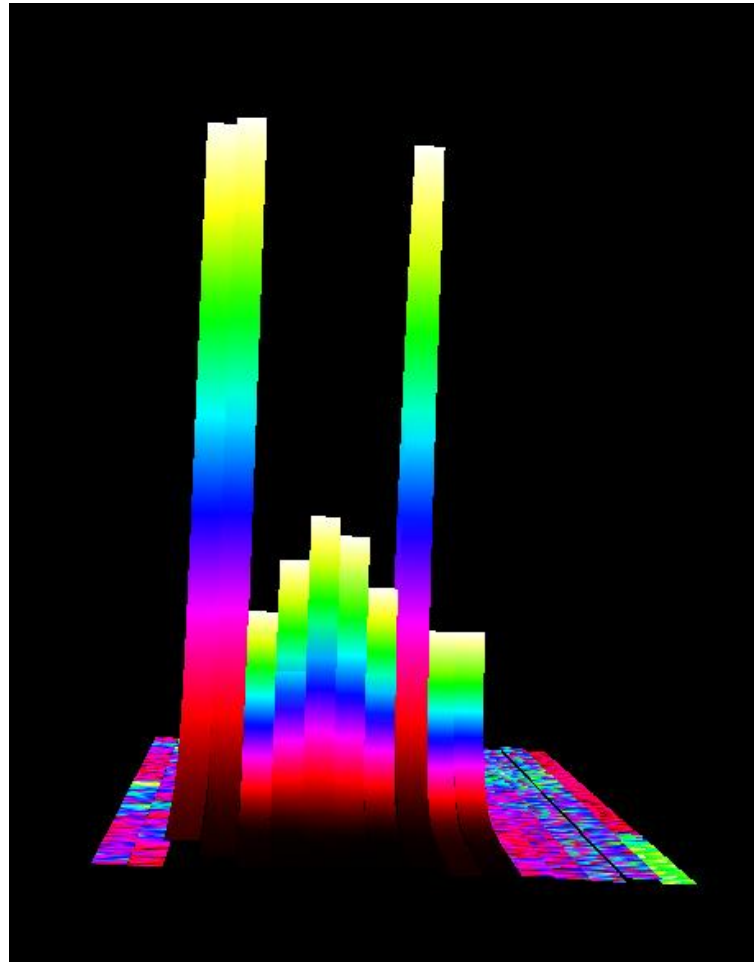
- 3D visualization of averaged data sets



Topographic Mapping



absolute



relative

maximum
amplitude



minimum
amplitude

Data Analysis

- POI HSSF api enables use of Excel formulas, such as:

STDEV(A1:A83)

- Addition of substitution algorithms using regular expressions and coordinated measure evaluations allows expressions like these:

IF([Alpha.Response]=1,MIN(A84:A103),)

Applications of EBCC DAT

- Visual examination of data to refine methodology of data analysis
- Comparison of subjects to determine differences in acquisition of association between conditioned stimulus (CS) and unconditioned stimulus(US).
- Renderings for eyeblink classical conditioning research publications