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## Progress Summary

Feroze Mohideen

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- Peak Detection Algorithm
- AxonDeepSeg

# Peak Detection Algorithm

- Rewriting previous code
- Laying foundation for large-scale data analysis
- Method 1: Aggregate Mean Analysis
- Method 2: Median of Medians Approach
- Results and Conclusions
- Deployment Protocol

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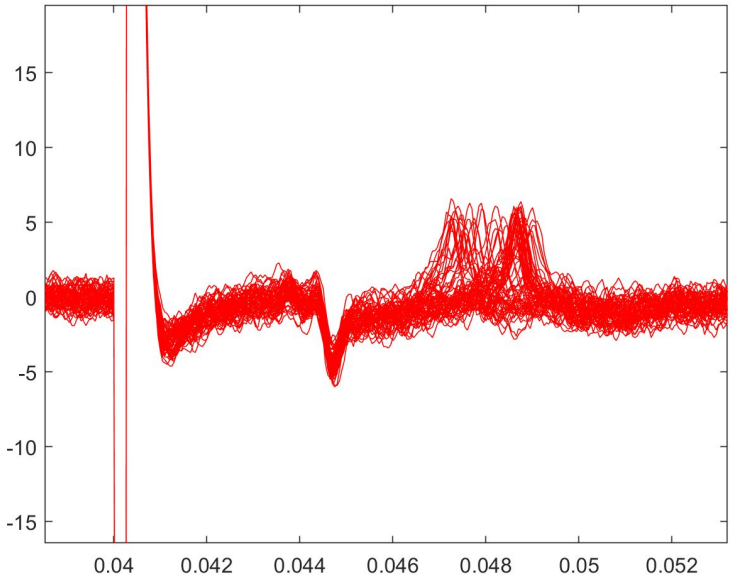
# Rewriting previous code

- Changed around Kam's code, with same core concepts:
  - Identification of first peak following SA
  - Work backwards to isolate entire peak

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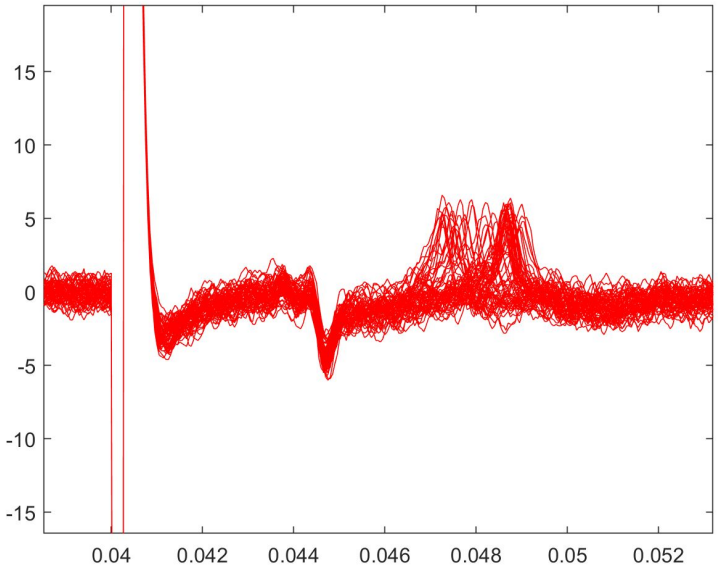
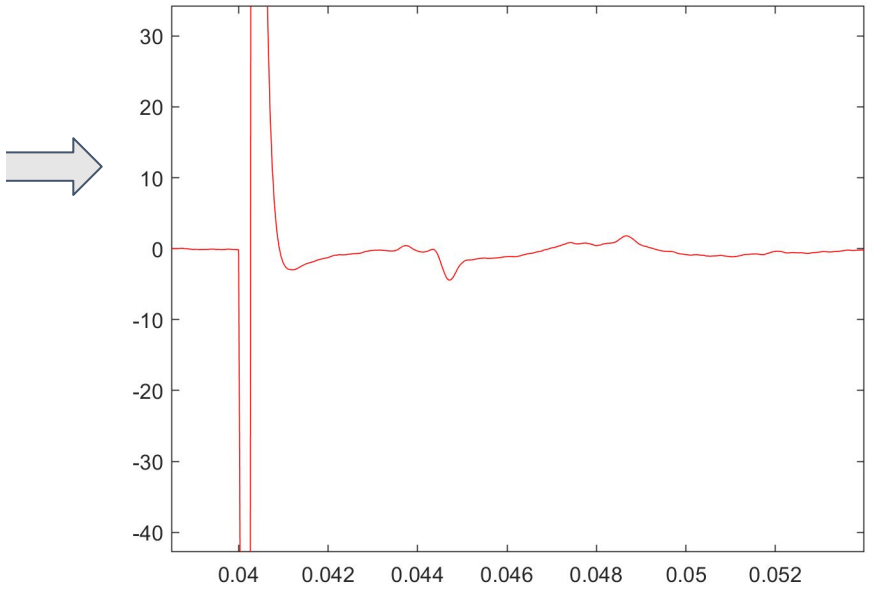
# Large-Scale Data Analysis

- Workflow
  - Convert folder of LabChart files to .txt files
  - Run analysis on entire folder instead of each file
  - Output aggregate results

# Method 1: Aggregate Mean Analysis

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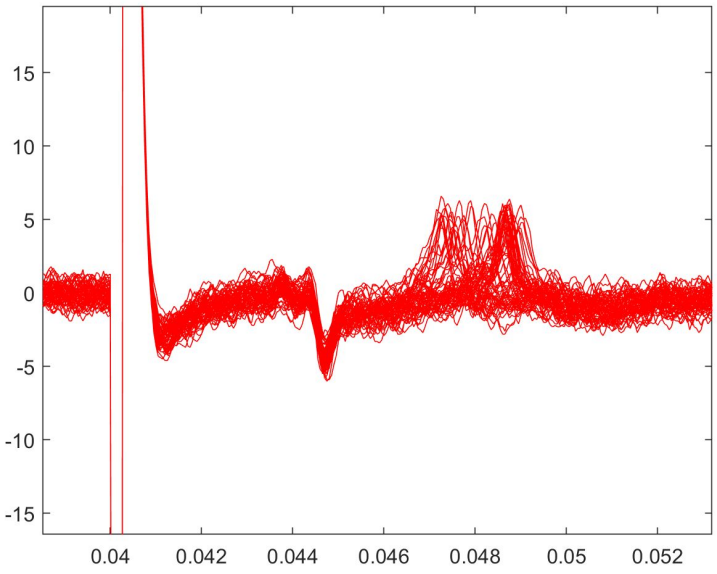
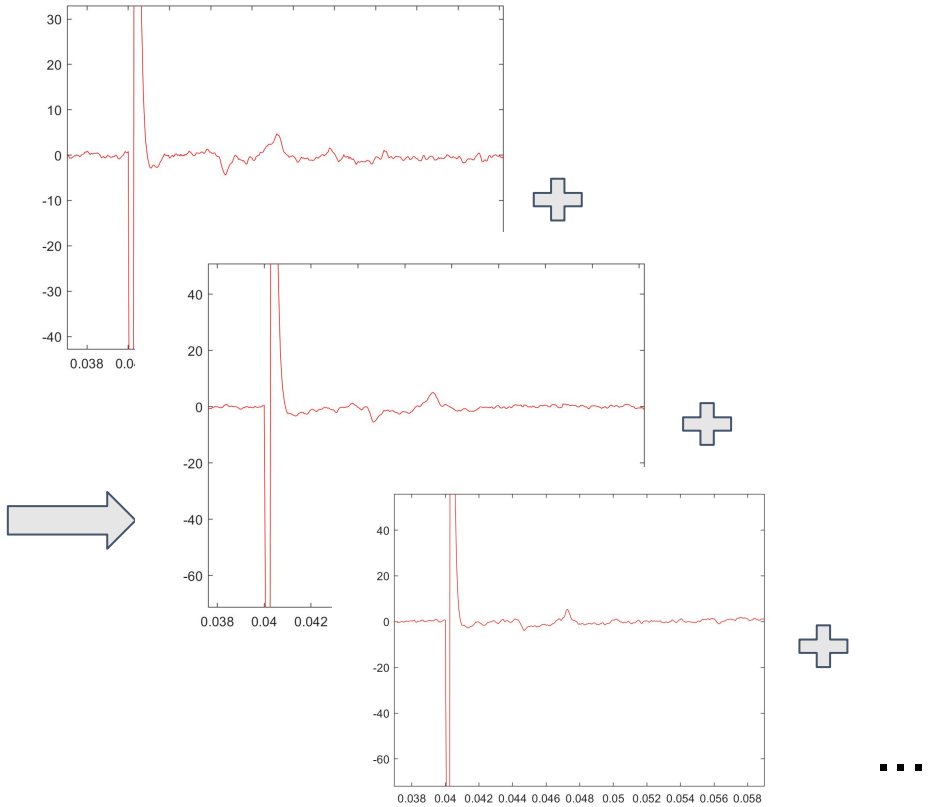
# Method 2: Median of Medians Approach

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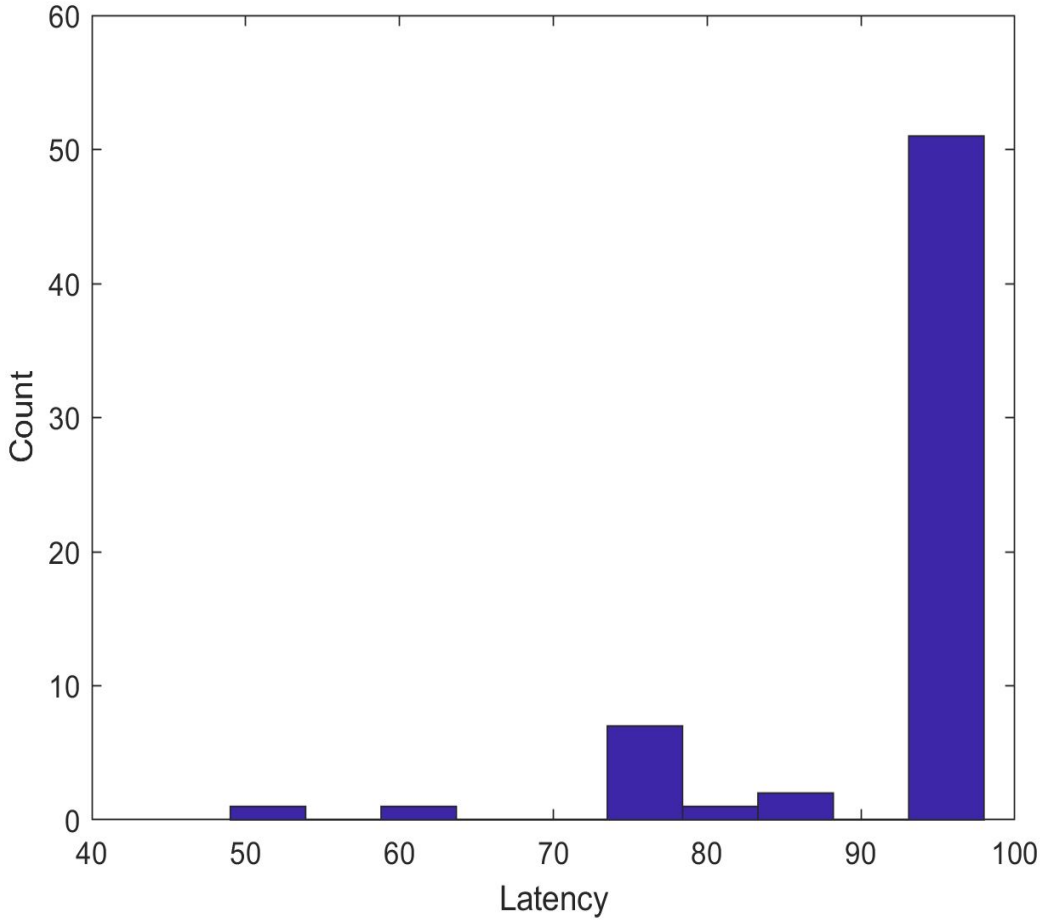
# Resulting Histogram




| Group | Amplitude | Latency |
|---|---|---|
| ctrl 1.1.1.txt | 8.15 | 250.5 |
| ctrl 1.1.2.txt | 5.15 | 111 |
| ctrl 1.1.3.txt | 3.55 | 247.5 |
| ctrl 1.1.4.txt | 14.4 | 126 |
| ctrl 1.2.1.txt | 3.6 | 237 |
| ctrl 1.2.2.txt | 4.4 | 138 |
| ctrl 1.2.3.txt | 8.1 | 166 |
| ctrl 1.2.4.txt | 8.5 | 61 |
| ctrl 2.1.1.txt | 6.6 | 184 |
| ctrl 2.1.2.txt | 4.3 | 181.5 |
| ctrl 2.1.3.txt | 6.8 | 169.5 |
| ctrl 2.1.4.txt | 6.8 | 97 |
| ctrl 2.2.1.txt | 3.8 | 191 |

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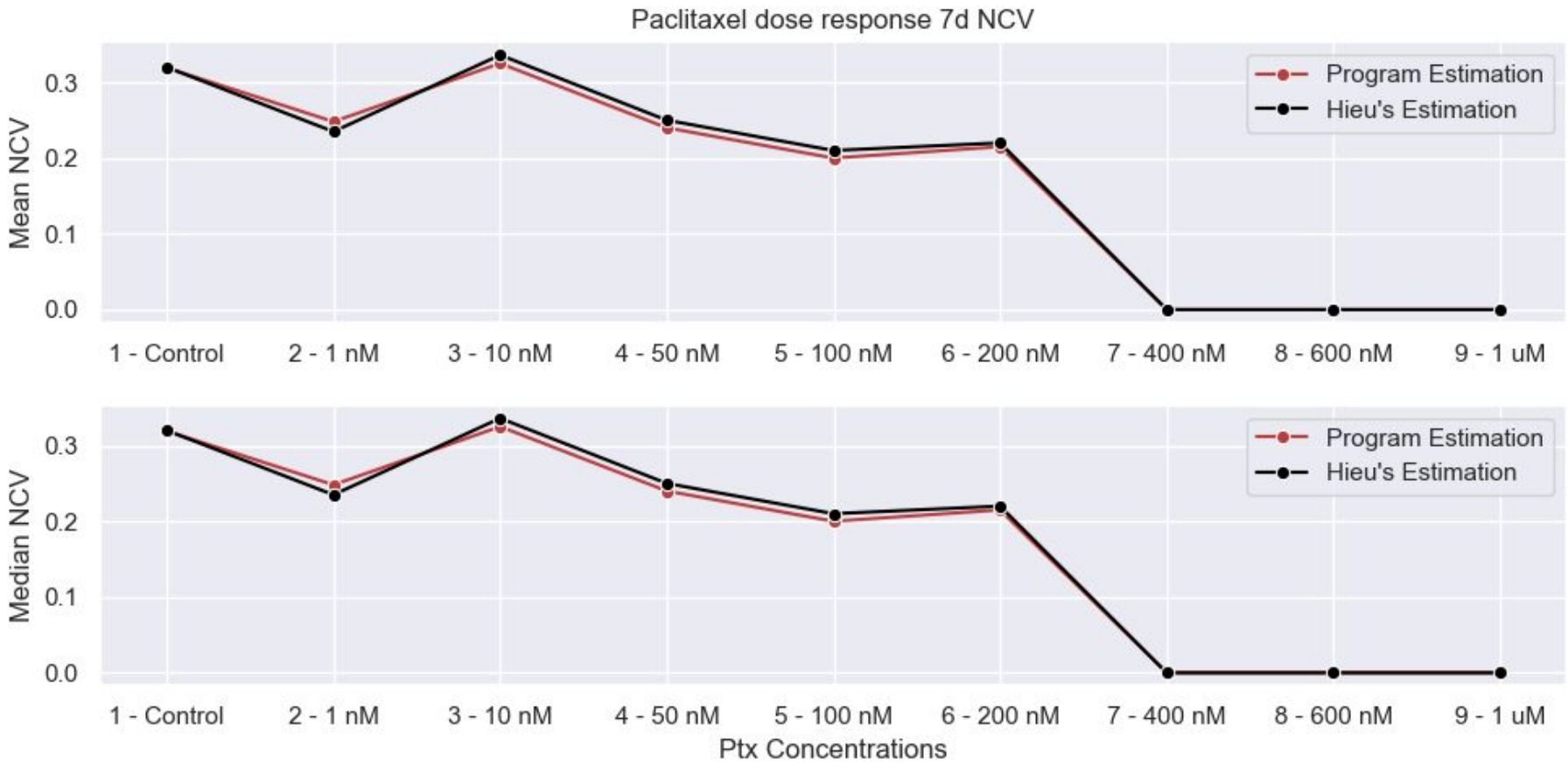
# Results

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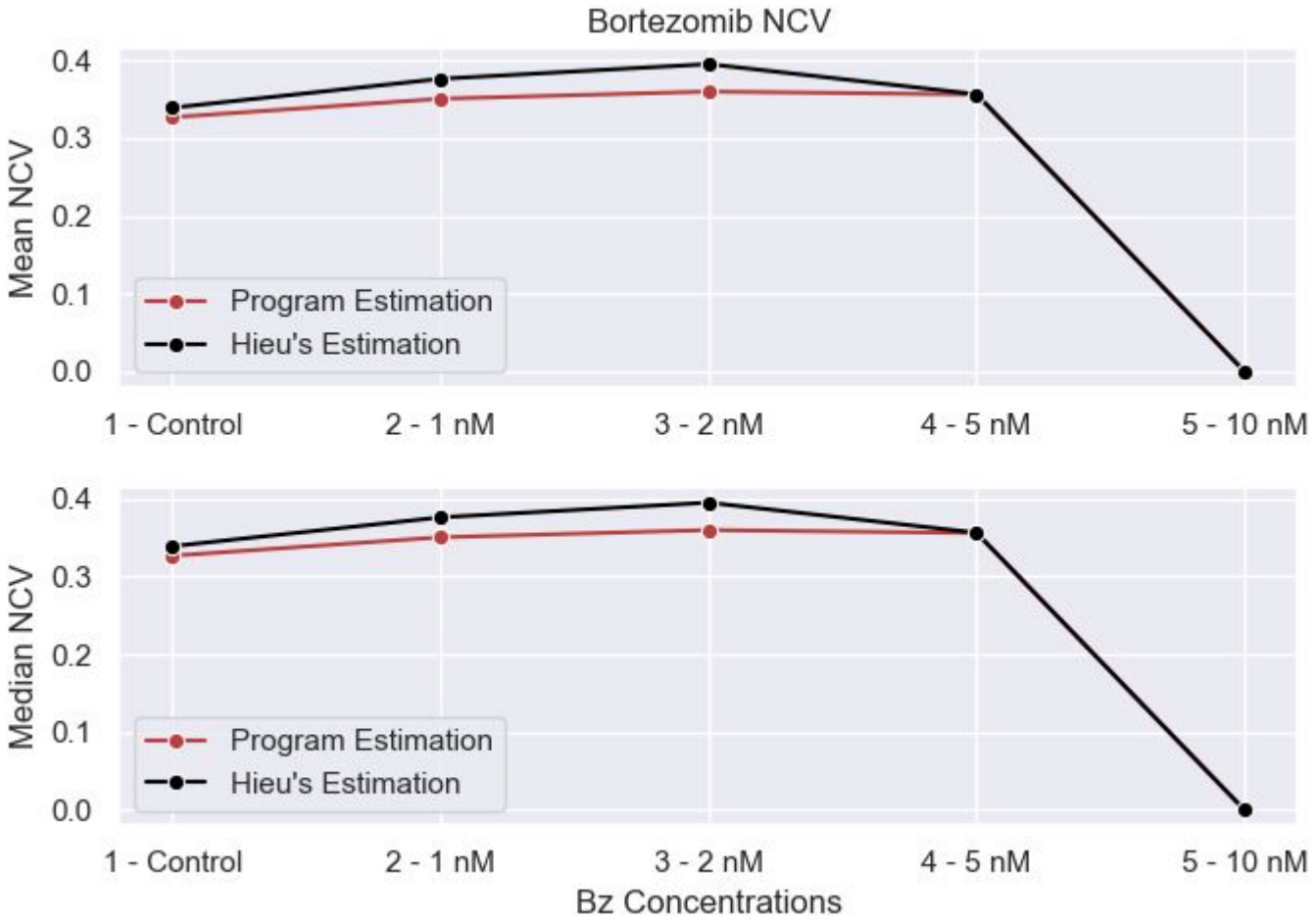
# Results (continued)

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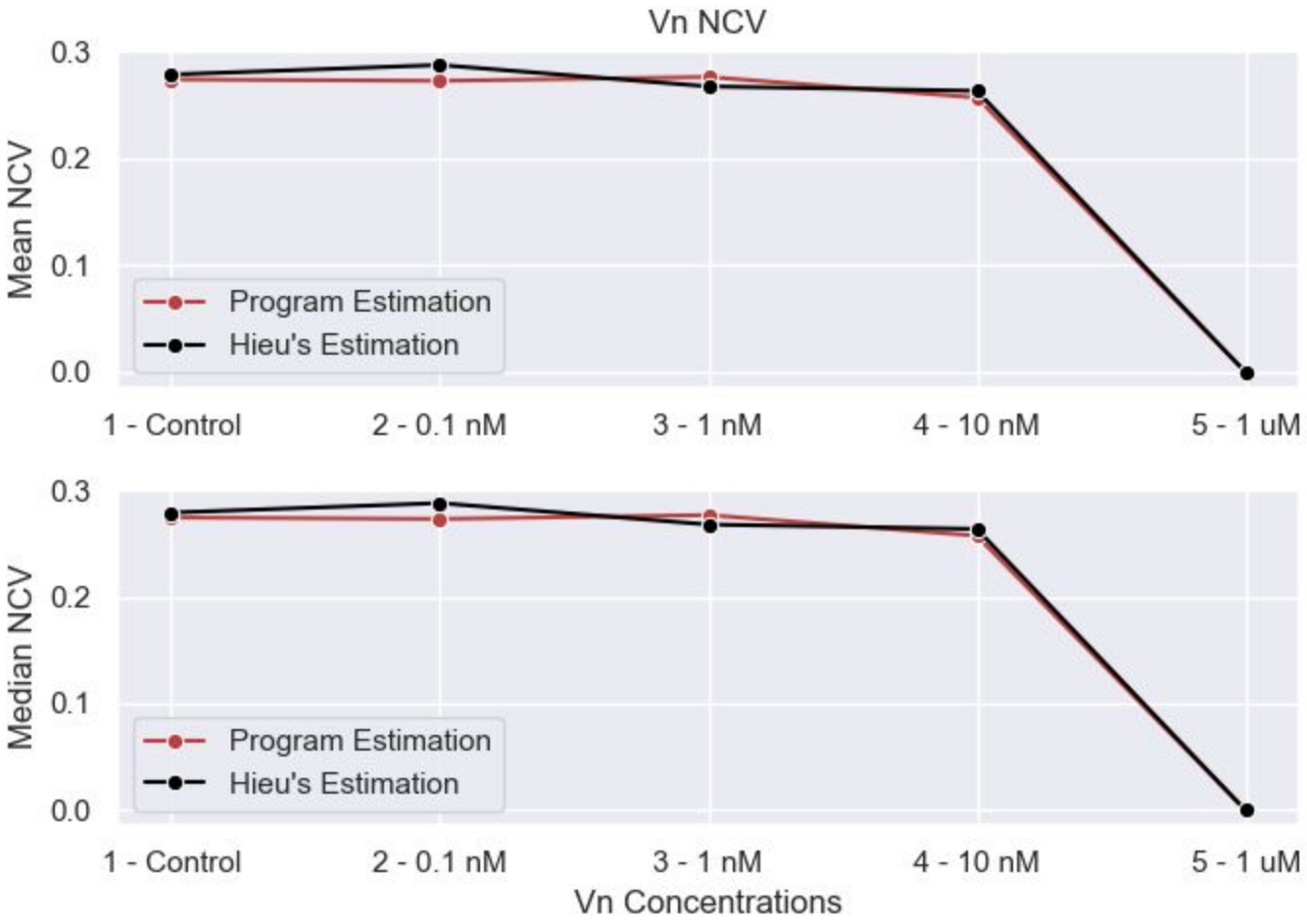
# Results (continued)

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# Conclusions

- Present new and efficient way of performing large-scale NCV analysis
- Program is objective and robust
  - Running the tests on the same files will *always* yield the same results, regardless of user

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# Deployment


Folder Layout

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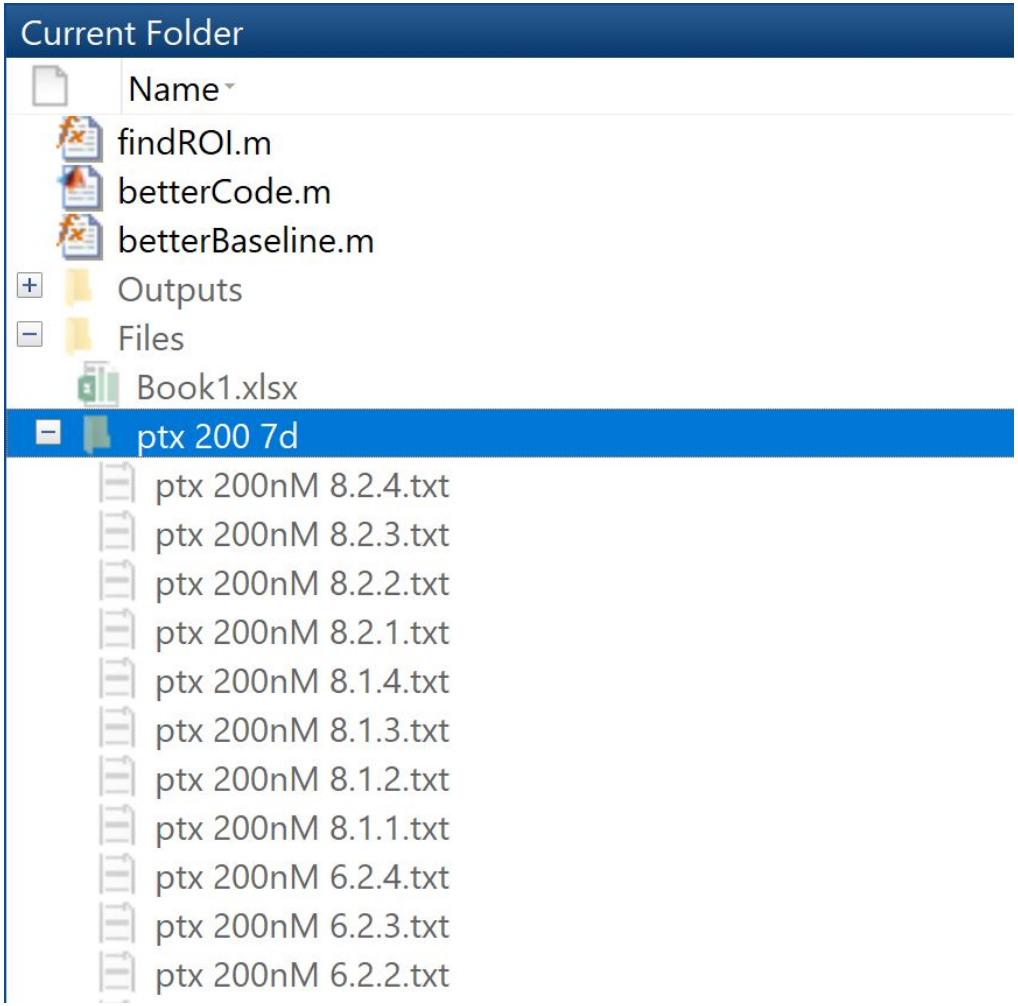
# Deployment

1. Convert LabChart Files to .txt files (separate procedure)
2. Place folder inside ‘Files’ folder
3. ALSO include lengths file, can be named anything

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# Deployment

| | |
|---|---|
| ctrl 1.1.1.txt | 3.931111 |
| ctrl 1.1.2.txt | 1.673333 |
| ctrl 1.1.3.txt | 3.106667 |
| ctrl 1.1.4.txt | 1.102222 |
| ctrl 1.2.1.txt | 3.622222 |
| ctrl 1.2.3.txt | 4.235556 |
| ctrl 1.2.2.txt | 1.16 |
| ctrl 1.2.4.txt | 1.655556 |
| ctrl 2.1.1.txt | 3.52 |
| ctrl 2.1.2.txt | 1.344444 |
| ctrl 2.1.3.txt | 3.42 |
| ctrl 2.1.4.txt | 1.277778 |
| ctrl 2.2.1.txt | 4.195556 |
| ctrl 2.2.2.txt | 1.382222 |
| ctrl 2.2.3.txt | 3.88 |
| ctrl 2.2.4.txt | 1.275556 |
| ctrl 3.1.1.txt | 3.068889 |
| ctrl 3.1.2.txt | 1.306667 |
| ctrl 3.1.3.txt | 3.577778 |
| ctrl 3.1.4.txt | 1.28 |
| ctrl 3.2.1.txt | 3.746667 |
| ctrl 3.2.2.txt | 1.244444 |
| ctrl 3.2.3.txt | 4.071111 |
| ctrl 3.2.4.txt | 1.526667 |
| ctrl 4.1.1.txt | 3.062222 |

Example lengths file

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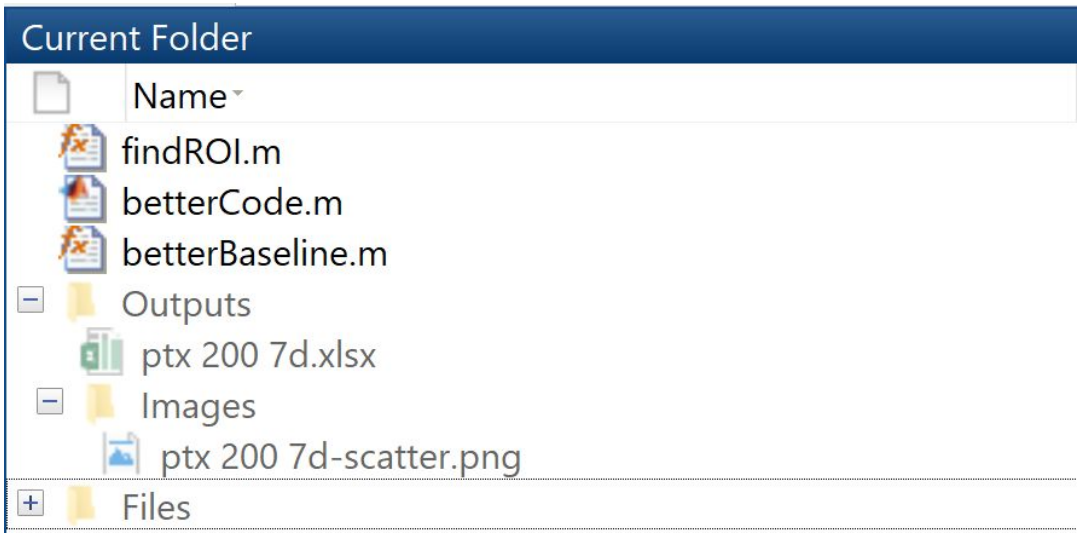
# Deployment

1. After, run betterCode.m
2. All trace data will be saved in the OUTPUTS folder
   a. Excel file with all NCV data
   b. Scatter plot of categorical results in IMAGES folder

```
>> betterCode
Analyzing file 'ctrl 1.1.1.txt' (1/85)
Analyzing file 'ctrl 1.1.2.txt' (2/85)
Analyzing file 'ctrl 1.1.3.txt' (3/85)
Analyzing file 'ctrl 1.1.4.txt' (4/85)
Analyzing file 'ctrl 1.2.1.txt' (5/85)
```

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# Deployment

```
>> betterCode
Analyzing file 'ctrl 1.1.1.txt' (1/85)
Analyzing file 'ctrl 1.1.2.txt' (2/85)
Analyzing file 'ctrl 1.1.3.txt' (3/85)
Couldn't find the length of ctrl 1.1.3.txt in the lengths file!
To continue without this file, press y. Otherwise, press n to exit. Enter:
```

Example error in lengths input

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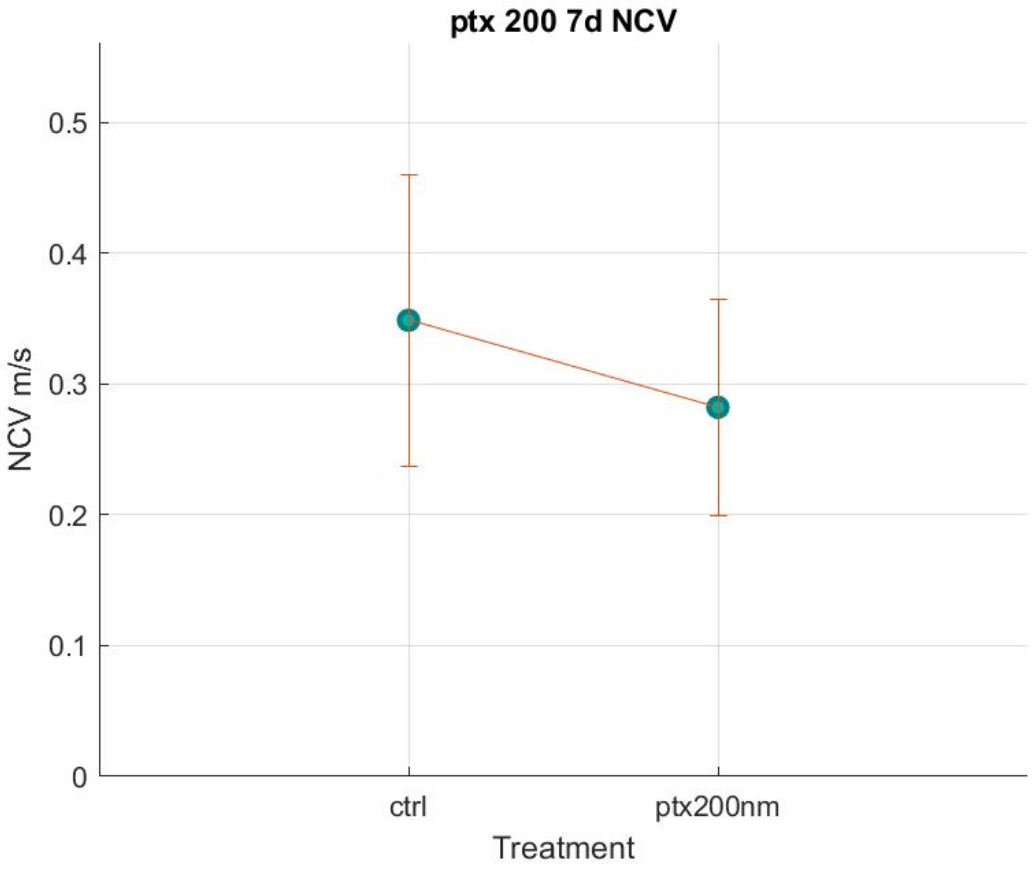
# Deployment

| Group | Amplitude | Latency | Length (mm) | NCV (m/s) |
|---|---|---|---|---|
| ctrl 1.1.1.txt | 8.15 | 250.5 | 3.9311 | 0.31386 |
| ctrl 1.1.2.txt | 5.15 | 111 | 1.6733 | 0.3015 |
| ctrl 1.1.3.txt | 3.55 | 247.5 | 3.1067 | 0.25104 |
| ctrl 1.1.4.txt | 14.4 | 126 | 1.1022 | 0.17496 |
| ctrl 1.2.1.txt | 3.6 | 237 | 3.6222 | 0.30567 |
| ctrl 1.2.2.txt | 4.4 | 138 | 1.16 | 0.16812 |
| ctrl 1.2.3.txt | 8.1 | 166 | 4.2356 | 0.51031 |
| ctrl 1.2.4.txt | 8.5 | 61 | 1.6556 | 0.54281 |
| ctrl 2.1.1.txt | 6.6 | 184 | 3.52 | 0.38261 |
| ctrl 2.1.2.txt | 4.3 | 181.5 | 1.3444 | 0.14815 |
| ctrl 2.1.3.txt | 6.8 | 169.5 | 3.42 | 0.40354 |
| ctrl 2.1.4.txt | 6.8 | 97 | 1.2778 | 0.26346 |
| ctrl 2.2.1.txt | 3.8 | 191 | 4.1956 | 0.43933 |
| ctrl 2.2.2.txt | 5.6 | 89 | 1.3822 | 0.31061 |
| ctrl 2.2.3.txt | 8.6 | 226 | 3.88 | 0.34336 |
| ctrl 2.2.4.txt | 6.1 | 91 | 1.2756 | 0.28034 |
| ctrl 3.1.1.txt | 16.45 | 178 | 3.0689 | 0.34482 |

Output excel file

# Deployment




Output scatter plot

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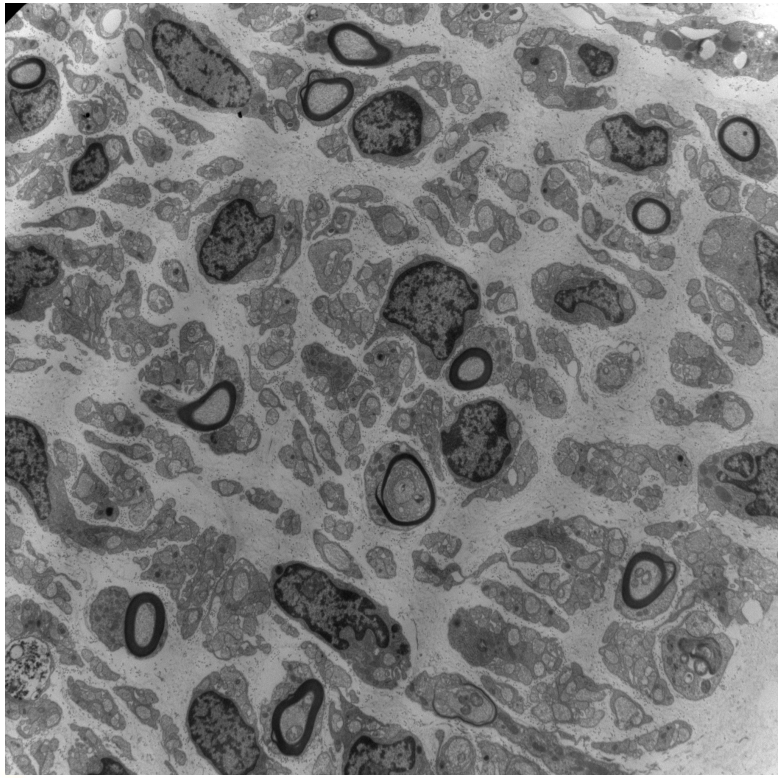
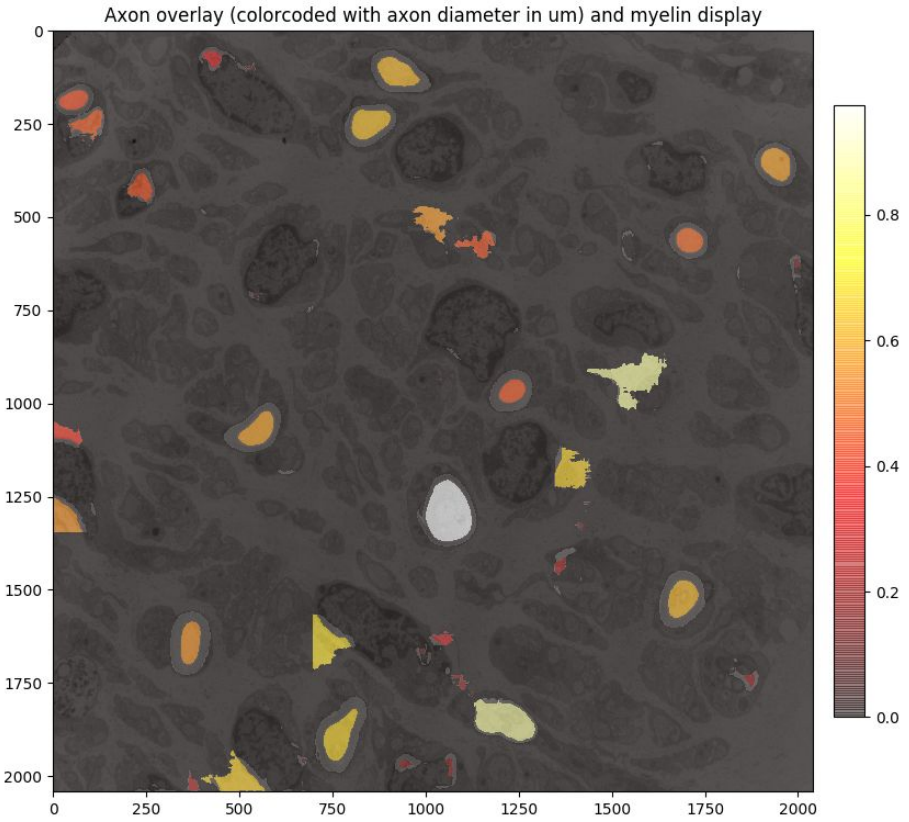
# AxonDeepSeg

- Promising approach for automated segmentation of TEM and SEM images



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## Thanks to all of you guys for this opportunity!

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