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Last Updated: 6/29/2024

## Mines SIF Tree Documentation

### 1. About

#### 1.1 Introduction

This document contains information pertaining to the future use and maintenance of the Mines Shared Instrumentation Facility (SIF) flowchart plugin. This document should be considered living, meaning any modifications to the plugin should be reflected and updated in this document. For questions or assistance regarding this document, please contact the document author. For questions regarding the SIF flowchart, please reach out to any/all of the contacts listed below:

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#### 1.2 Associated Files

This document primarily references the `index.html` and `data.js` files that compose the plugin webpage. **When obtaining the file from WordPress, these two files (along with `script.js` and `style.css`) may have been combined into a single HTML file with the JavaScript functionality existing inside a `<script>` tag and the CSS functionality existing inside a `<style>` tag. This was done to ensure it would work with a WordPress HTML injector, like [the one shown here](#). Using a WordPress HTML injector is what allows us to write custom code which can be used in.** To view these files and any other code associated with this project, please refer to the [GitHub repository](#).

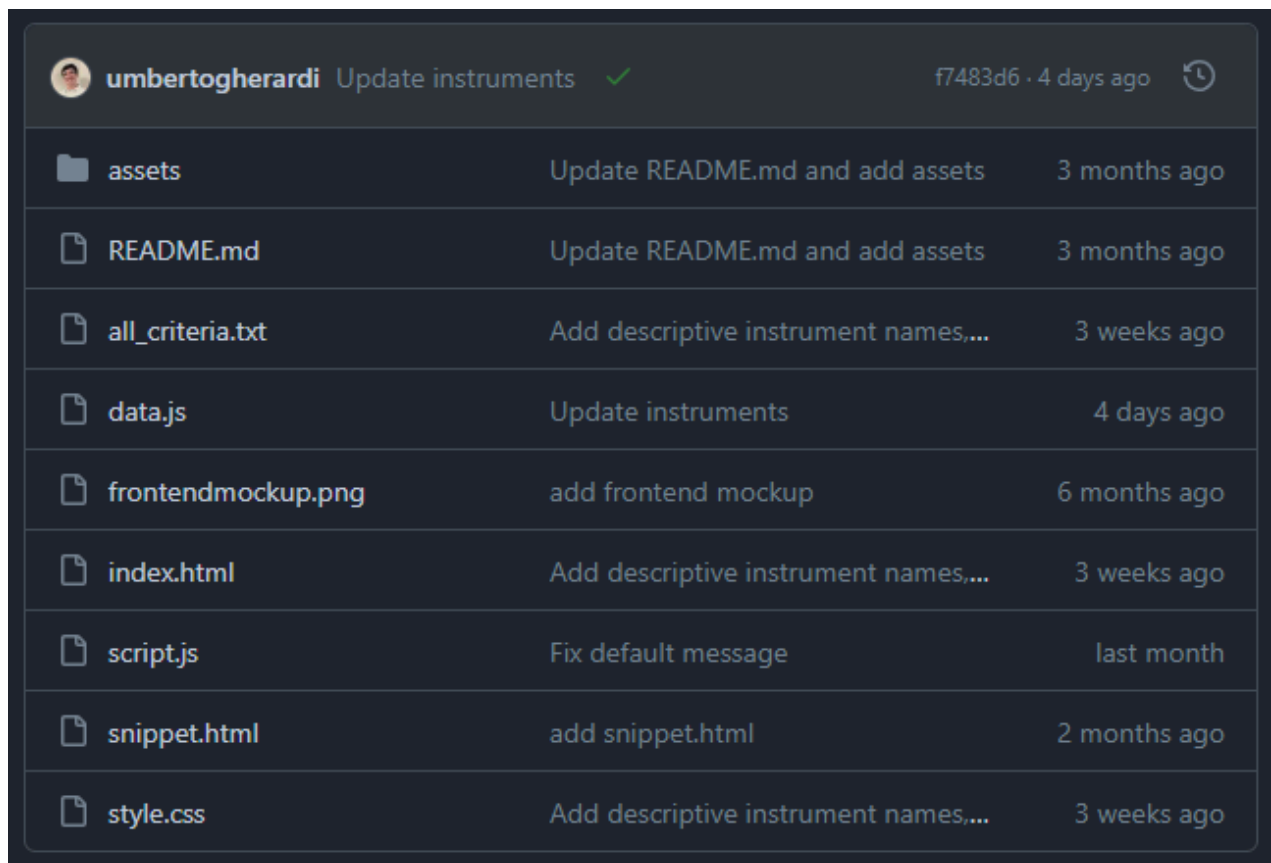
(Note that the text above in **red** is only applicable if the plugin is directly inserted into the SIF website. If the plugin is hosted on a separate site, e.g. using Cloudflare or GitHub Pages, then the **red** text above can be disregarded.)

A brief description of each of the files/folder currently shown in the folder is provided in Table 1. The files/folder shown in Table 1 directly map to the files/folders shown in Figure 1, which is a screenshot of the GitHub repository.

Name	File/Folder	Description
assets	Folder	Contains the initial spreadsheet data used to create and test the first version of the plugin. Any documents in this folder should be considered deprecated.
README.md	File	A GitHub-specific file that just displays the name of the repository. Is not important to the actual plugin.
all_criteria.txt	File	This text file lists all of the possible criteria available to the machines. This file is not important to the actual plugin. Any modifications to the criteria should be reflected in this document to ensure consistency.
data.js	File	This JavaScript file is where all of the data for the machines live. This file is read and processed by <code>script.js</code> to generate the machine list and properly map the criteria to each machine.
frontendmockup.png	File	An initial mockup of the user interface for the plugin.
index.html	File	This HTML file acts as the skeleton for which the data from the <code>data.js</code> is used to populate.
script.js	File	This JavaScript file reads the data from <code>data.js</code> and adds it to <code>index.html</code> . This file is also used to provide interactivity, e.g., clicking on a criteria button will gray-out

		the non-applicable machines.
snippet.html	File	This HTML file shows how the JavaScript and HTML files need to be combined in order for them to work with the WordPress HTML injector. This file is deprecated, but can still be used to understand the format that the HTML injector requires.
style.css	File	This CSS file contains all of the styles used to format the plugin webpage, including displaying items in a certain arrangement and adding color to the components.

Table 1 - File & Folder Descriptions



The screenshot displays a GitHub repository interface for the user 'umbertogherardi'. At the top, a commit titled 'Update instruments' is shown with a green checkmark, commit hash 'f7483d6', and a timestamp of '4 days ago'. Below this, a list of files and folders is presented, each with an icon, the file name, the commit message, and the time since the last commit. The files listed are 'assets' (folder), 'README.md', 'all\_criteria.txt', 'data.js', 'frontendmockup.png', 'index.html', 'script.js', 'snippet.html', and 'style.css'. The commit messages for these files include 'Update README.md and add assets', 'Add descriptive instrument names,...', 'Update instruments', 'add frontend mockup', 'Fix default message', and 'add snippet.html'.












 <b>umbertogherardi</b>	Update instruments ✓	f7483d6 · 4 days ago	
 <b>assets</b>	Update README.md and add assets	3 months ago	
 <b>README.md</b>	Update README.md and add assets	3 months ago	
 <b>all_criteria.txt</b>	Add descriptive instrument names,...	3 weeks ago	
 <b>data.js</b>	Update instruments	4 days ago	
 <b>frontendmockup.png</b>	add frontend mockup	6 months ago	
 <b>index.html</b>	Add descriptive instrument names,...	3 weeks ago	
 <b>script.js</b>	Fix default message	last month	
 <b>snippet.html</b>	add snippet.html	2 months ago	
 <b>style.css</b>	Add descriptive instrument names,...	3 weeks ago	

Figure 1 - File & Folder View in GitHub Repository

## 2. Functionality

### 2.1 Description

At a high level, the data from `data.js` is mapped by `script.js` into the `index.html` file. Each machine in the `data.js` file contains data attributes. For example, the FEI Helios FIB/SEM machine has the following data attributes:

```
"phase-solid": true,  
"solid_form-crystalline": true,  
"solid_form-amorphous": true,  
"solid_form-thin_film": true,  
"solid_form-powder": true,  
"solid_props-phase": true,  
"solid_props-crystallographic_texture": true,  
"spatial_res-mm": true,  
"spatial_res-um": true,  
"spatial_res-nm": true,  
"dimensionality-1d": true,  
"dimensionality-2d": true,  
"dimensionality-3d": true,  
"comp_sensitivity-a_few_at_%": true,  
"temp-room": true,  
"atmosphere-vacuum": true,
```

Figure 2 - The FEI Helios FIB/SEM Data Attributes from the `data.js` File.

These data attributes correspond to the criteria checkboxes; if a criteria checkbox is selected, and a machine doesn't have that criteria as a data attribute, it will become grayed-out and unclickable. Note that for a data attribute to map to its corresponding checkbox, its checkbox must have an id with the same exact name as the data attribute.

Consider the “Phase” criteria as an example. As we can see from Figure 2 above, the FEI Helios FIB/SEM machine has the data attribute `"phase-solid": true`. This attribute maps to the checkbox with the id of “phase-solid” (as shown in Figure 3) in the `index.html` file because the data attribute directly matches the id of the input/checkbox element.



Figure 3 - The “Phase” Criteria Group and the Corresponding HTML.

If a checkbox is selected, its id is added to a filter list. On every checkbox select/deselect, the filter list is updated. Any machines that do not contain every filter from the filter list as a data attribute will become unselectable. Thus, the ids of the checkboxes must match those of their corresponding data attributes, or this filtering process will not work.

### 3. Modifying The SIF Plugin

#### 3.1 Adding New Criteria to an Existing Group

To add new criteria to an existing criteria group, start by locating the group in the `index.html` file. The name of a group will always be an `<h3>` element located directly under a `<div>` element with a class of “criteria-group”. For example, the “Dimensionality” criteria group corresponds to the following HTML:

```
<div class="criteria-group">
  <h3>Dimensionality</h3>
  <div class="checkbox-container">
    <input id="dimensionality-1d" type="checkbox">
    <span>1D</span>
  </div>
  <div class="checkbox-container">
    <input id="dimensionality-2d" type="checkbox">
    <span>2D</span>
  </div>
  <div class="checkbox-container">
```

```

        <input id="dimensionality-3d" type="checkbox">
        <span>3D</span>
    </div>
</div>

```

Figure 4 - The HTML for the “Dimensionality” Criteria Group.

To add a new criteria to a group, adhere to the following steps:

1. Insert a new `<div>` element with a class of “checkbox-container” into the desired position within the “criteria-group” `<div>`.
2. Give the `<input>` element within the new “checkbox-container” a new id. The naming convention for a new criteria id is ultimately up to the programmer, but a good practice is to name it as follows: `<criteria group name>-<criteria attribute name>`. Underscores ( `_` ) should be used to replace spaces as necessary, e.g. the “Solid Form → Powder” criteria maps to an id of `"solid_form-powder": true`. Abbreviations may also be used, e.g. the “Solid Properties → Phase” criteria maps to an id of `"solid_props-phase": true`.
3. Add the desired display name for the checkbox inside the `<span>` element. This can be anything, and doesn’t need to match the `<input>` element’s id.
4. Add the new `<input>` element’s id as a data property to any of the desired machines.

If we wished to add a new “4D” criteria to the “Dimensionality” group and add the criteria to the FEI Helios FIB/SEM machine, here’s what each step would look like:

1. Insert a new `<div>` element with a class of “checkbox-container” into the desired position within the “criteria-group” `<div>`.

```

<div class="criteria-group">
    <h3>Dimensionality</h3>
    <div class="checkbox-container">
        <input id="dimensionality-1d" type="checkbox">
        <span>1D</span>
    </div>
    <div class="checkbox-container">
        <input id="dimensionality-2d" type="checkbox">
        <span>2D</span>
    </div>
    <div class="checkbox-container">

```

```

        <input id="dimensionality-3d" type="checkbox">
        <span>3D</span>
    </div>
    <div class="checkbox-container">
        <input id="" type="checkbox">
        <span></span>
    </div>
</div>

```

2. Give the `<input>` element within the new “checkbox-container” a new id.

```

<div class="checkbox-container">
    <input id="dimensionality-4d" type="checkbox">
    <span></span>
</div>

```

3. Rename the `<span>` element with the desired display name attached to the checkbox.

```

<div class="checkbox-container">
    <input id="dimensionality-4d" type="checkbox">
    <span>4D</span>
</div>

```

4. Add the new `<input>` element’s id as a data property to the FEI Helios FIB/SEM machine.

```

"FEI Helios FIB/SEM": {
    "link": ...,
    "phase-solid": true,
    "solid_form-crystalline": true,
    "solid_form-amorphous": true,
    "solid_form-thin_film": true,
    "solid_form-powder": true,
    "solid_props-phase": true,
    "solid_props-crystallographic_texture": true,
    "spatial_res-mm": true,
    "spatial_res-um": true,
    "spatial_res-nm": true,

```

```

"dimensionality-1d": true,
"dimensionality-2d": true,
"dimensionality-3d": true,
"dimensionality-4d": true,
"comp_sensitivity-a_few_at_%": true,
"temp-room": true,
"atmosphere-vacuum": true,
}

```

We now see an additional “4D” checkbox under the “Dimensionality” criteria. Selecting it shows that only the FEI Helios FIB/SEM machine has that property.

**INSTRUMENTS**

- FEI Helios FIB/SEM
- Tescan S8252G Raman-SEM/FIB
- JEOL JSM-7000F
- FEI Quanta ESEM
- Phenom SEM
- FEI Talos F200X
- FEI Tecnai T12
- IONTOF TOF-SIMS V
- Cameca LEAP 4000X Si
- Sciex 5500 Triple Quad
- Sciex x500R QToF
- Thermo Scientific Orbitrap Exploris 240
- FTIR Spectrometer/Ellipsometer
- UV-Vis Spectrometer
- Woollam M-2000 Ellipsometer
- ASYLUM MFP-3D SPM
- Digital Instruments AFM

**CRITERIA**

Narrow down instruments by selecting from the criteria below. If criteria are inapplicable, please leave them unselected.

<b>Phase</b> <input type="checkbox"/> Solid <input type="checkbox"/> Liquid	<b>Solid Form</b> <input type="checkbox"/> Crystalline <input type="checkbox"/> Amorphous <input type="checkbox"/> Thin Film <input type="checkbox"/> Powder	<b>Solid Properties</b> <input type="checkbox"/> Phase <input type="checkbox"/> Crystallographic Texture <input type="checkbox"/> Strain <input type="checkbox"/> Chemical Bonding	<b>Spatial Resolution</b> <input type="checkbox"/> mm <input type="checkbox"/> μm <input type="checkbox"/> nm	<b>Dimensionality</b> <input type="checkbox"/> 1D <input type="checkbox"/> 2D <input type="checkbox"/> 3D <input checked="" type="checkbox"/> 4D
<b>Compositional Sensitivity</b> <input type="checkbox"/> A Few At % <input type="checkbox"/> PPM	<b>Temperature</b> <input type="checkbox"/> Room Temp <input type="checkbox"/> Heated <input type="checkbox"/> Cooled	<b>Mechanical Testing</b> <input type="checkbox"/> Tension <input type="checkbox"/> Compression <input type="checkbox"/> Bending <input type="checkbox"/> Fatigue <input type="checkbox"/> Torsion <input type="checkbox"/> Static	<b>Force Ranges</b> <input type="checkbox"/> nN <input type="checkbox"/> N <input type="checkbox"/> kN <input type="checkbox"/> >250 kN	<b>Atmosphere</b> <input type="checkbox"/> Ambient <input type="checkbox"/> Vacuum <input type="checkbox"/> Other (Controlled Gas Environment)

Clear Selected criteria

Figure 5 - The Updated SIF Plugin After Adding a New “4D” Dimensionality Criteria to the FEI Helios FIB/SEM Machine.

### 3.2 Adding a New Criteria Group

To add a new criteria group, navigate to the `index.html` file and adhere to the following steps:

1. Copy and insert a new `<div>` element with a class of “criteria-group” into the desired position within the “criteria-panel” `<div>`.
2. Add the desired display name for the criteria group inside the `<h3>` element. This name can be anything and doesn’t need to match any other ids.
3. Follow the steps listed under Section 3.1 to add the desired criteria to the new group.

### 3.3 Adding a New Machine

To add a new machine, navigate to the `data.js` file and adhere to the following steps:

1. Insert a new machine name in the desired position of the “Instruments” panel. This will be the name the machine will be displayed under in the “Instruments” panel.



2. Add a “link” attribute that references the webpage containing the detailed information of the machine. This is the link that a user will be redirected to when they click on the machine name in the “Instruments” panel. If a machine is lacking a detailed webpage, simply leave the link as an empty string (“”).
3. Add the desired data attributes, ensuring that each attribute maps to an existing checkbox id.

If we wished to add a new machine called “Test Machine”, with a link to “<https://google.com>”, and criteria “Temperature → Room” and “Solid Form → Powder”, here’s what each step would look like:

1. Add a new machine name in the desired position of the “Instruments” panel.

```
"Test Machine": {  
  },
```

2. Add a “link” attribute that references the webpage containing the detailed information of the machine.

```
"Test Machine": {  
  "link": "https://google.com",  
},
```

3. Add the desired data attributes, ensuring that each attribute maps to an existing checkbox id.

```
"Test Machine": {  
  "link": "https://google.com",  
  "temp-room": true,  
  "solid_form-powder": true,  
},
```

If we insert the code shown in Step 3 above (at the top of our list within the “data” object), we will see it show up as the first item in our instruments panel.

The screenshot displays the SIF Plugin interface. On the left, the 'INSTRUMENTS' panel lists various test machines. The first item, 'Test Machine', is highlighted in dark blue. Below it are 'FEI Helios FIB/SEM', 'Tescan S8252G Raman-SEM/FIB', 'JEOL JSM-7000F', 'FEI Quanta ESEM', 'Phenom SEM', 'FEI Talos F200X', 'FEI Tecnai T12', 'IONTOF TOF-SIMS V', 'Cameca LEAP 4000X Si', 'Sciex 5500 Triple Quad', 'Sciex x500R QToF', 'Thermo Scientific Orbitrap Exploris 240', 'FTIR', and 'Spectrometer/Ellipsometer'. On the right, the 'CRITERIA' panel allows users to narrow down instruments by selecting from four categories: Phase, Solid Form, Compositional Sensitivity, and Temperature. Each category has a set of checkboxes. The 'Solid Form' category has 'Powder' selected, indicated by a dark blue square. The 'Temperature' category has 'Room Temp' selected, also indicated by a dark blue square.

INSTRUMENTS	CRITERIA
<b>Test Machine</b>	<b>Phase</b>
FEI Helios FIB/SEM	<input type="checkbox"/> Solid
Tescan S8252G Raman-SEM/FIB	<input type="checkbox"/> Liquid
JEOL JSM-7000F	<b>Solid Form</b>
FEI Quanta ESEM	<input type="checkbox"/> Crystalline
Phenom SEM	<input type="checkbox"/> Amorphous
FEI Talos F200X	<input type="checkbox"/> Thin Film
FEI Tecnai T12	<input checked="" type="checkbox"/> Powder
IONTOF TOF-SIMS V	<b>Compositional Sensitivity</b>
Cameca LEAP 4000X Si	<input type="checkbox"/> A Few At %
Sciex 5500 Triple Quad	<input type="checkbox"/> PPM
Sciex x500R QToF	<b>Temperature</b>
Thermo Scientific Orbitrap Exploris 240	<input checked="" type="checkbox"/> Room Temp
FTIR	<input type="checkbox"/> Heated
Spectrometer/Ellipsometer	<input type="checkbox"/> Cooled

Figure 5 - The Updated SIF Plugin After Adding a New “Test Machine” Instrument.

### 3.3 Updating a Machine’s Data Attributes

To update a machine’s data attributes, navigate to the `data.js` file and locate the machine you wish to modify. This can be done by holding CTRL + F and searching for the machine name.

After locating the machine, adhere to the following steps:

1. Determine which checkbox criteria you want to be attached to the machine in the `index.html` file.
2. Find the ids corresponding to the checkboxes.
3. After obtaining the ids, add them as data attributes inside the machine JSON.

If we wished to add a new criteria of “Temperature → Heated” to the FEI Helios FIB/SEM machine, here’s what each step would look like:

1. Determine which checkbox criteria you want to be attached to the machine in the `index.html` file.

```
<div class="criteria-group">  
  <h3>Temperature</h3>
```

```

<div class="checkbox-container">
  <input id="temp-room" type="checkbox">
  <span>Room Temp</span>
</div>
<div class="checkbox-container">
  <input id="temp-heated" type="checkbox">
  <span>Heated</span>
</div>
<div class="checkbox-container">
  <input id="temp-cooled" type="checkbox">
  <span>Cooled</span>
</div>
</div>

```

2. Find the ids corresponding to the checkboxes.

```

<div class="checkbox-container">
  <input id="temp-heated" type="checkbox">
  <span>Heated</span>
</div>

```

3. After obtaining the ids, add them as data attributes inside the machine JSON.

```

"FEI Helios FIB/SEM": {
  "link":
"https://www.mines.edu/shared-facilities/project/fei-helios-nano
lab-600i-fib-sem/",
  "phase-solid": true,
  "solid_form-crystalline": true,
  "solid_form-amorphous": true,
  "solid_form-thin_film": true,
  "solid_form-powder": true,
  "solid_props-phase": true,
  "solid_props-crystallographic_texture": true,
  "spatial_res-mm": true,
  "spatial_res-um": true,

```

```
    "spatial_res-nm": true,  
    "dimensionality-1d": true,  
    "dimensionality-2d": true,  
    "dimensionality-3d": true,  
    "comp_sensitivity-a_few_at_%": true,  
    "temp-room": true,  
    "temp-heated": true,  
    "atmosphere-vacuum": true,  
  },
```

## 4. Additional Resources

### 4.1 all\_criteria.txt

The `all_criteria.txt` file contains all the possible data attributes/checkbox ids that can be assigned to machines. When new criteria and criteria groups are added, this file should be updated to serve as a criteria reference bank.

### 4.2 data.js Doc Block

In the `data.js` file, there is a block of commented-out text before the data variable. This text was the precursor to this document and can be consulted for information that might have been left out of this document.