

# MIBItracker User Guide

v1.2.3

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# **MIBItracker Basics**

MIBItracker is a web application used to store, manage, and visualize image data produced by the lonpath MIBIscope. Users interact with the MIBItracker database via a web browser available on any operating system. It is also possible to interact with the MIBItracker through its REST API.

An individual account will be created for each user by the MIBItracker administrator. Each account is accessible through a unique password set by the user when the account is created. Access to data and images is controlled based on this user account.

# **MIBItracker Login**

To login to MIBItracker, first ensure that your computer is connected to the internet.

1. In your web browser navigate to https://yoursite.ionpath.com.

A unique address is provided for each institution.

2. On the login page, type in your email address and password, then click **Submit**. MIBItracker starts on the **Image Set** tab by default.

For security purposes MIBItracker will:

- 1. Block you for 5 minutes after three attempts to login with the wrong password.
- 2. Prevent you from re-using your last four passwords when resetting your password.

Note: For optimum performance use Chrome, Firefox, or Microsoft Edge v79 and higher.

# **User Interface**

The MIBItracker interface is composed of **Project Data** and **Resources** in the main menu and their respective data in the submenus. Project Data contains **Slides**, **Sections**, **Runs**, **Images**, and **Image Sets and Settings.** Resources contain **Panels**, **Conjugates**, **Tissues**, and **Instruments**.

The data in the submenus are represented as searchable tables. The columns in the table are sortable, and clicking on a row of a table navigates to the relevant details page. Individual image fields-of-view (FOVs) collected from the MIBIscope instrument are presented using an interface that allows users to fully customize their display while the underlying image data remains unaltered. Controls enable changing which channels are displayed, the overlay pseudo-colors, and the relative display intensity.

# **Projects Dropdown**

	-									
	IONPATH	Project [	Data	Resources						
	MIBIcontrol & M	I •	Slides	Sections	Runs	Images	Imag	e Sets	Settings	
1	All Projects					-				
	Recent Projects	5								
	Testing									
	MIBIcontrol &	MIBItracker	workflow		FOV	Name		FOV ID		Pane
ĺ	Shareable Ima	ages		trol & MIBItracker	FOV	1		FOV1		2019
	Demo									
	Offline mode			trol & MIBItracker	FOV	1		FOV1		2019
	Create New Pro	oject		trol & MIBItracker	FOV	1-backup		FOV1-back	up	Imm
	Search More			trol & MIBItracker	FOV	1		FOV1		Imm

Use this dropdown to filter the Project Data display by **All Projects** or a by specific project. You can also create and search projects from here.

# Data Table Display Mode

	IONPATH Project Data Resources demo.user@ionpath.com +						
All	Projects - Slides Sections Runs	Images Image Sets Settings					
Cr	Zreate Image Set						
			Search				Reset
	Name	Description	Project	View Images	Download Images	Delete	Modify
>	2021-05-03Toffline	Run 2021-05-03Toffline image set	Testing	View	Download	Î	Modify
>	2021-04-30NOBGRM	Run 2021-04-30NOBGRM image set	MIBIcontrol & MIBItracker workflow	View	Download	Û	Modify
>	2021-04-30MOLY	Run 2021-04-30MOLY image set	MIBIcontrol & MIBItracker workflow	View	Download	Î	Modify
>	2021-04-3MUTISCAN	Run 2021-04-3MUTISCAN image set	MIBIcontrol & MIBItracker workflow	View	Download	Î	Modify
>	2021-04-01TEST	Run 2021-04-01TEST image set	MIBIcontrol & MIBItracker workflow	View	Download	Î	Modify
>	2021-04-29T14-21-37	Run 2021-04-29T14-21-37 image set	MIBIcontrol & MIBItracker workflow	View	Download	Û	Modify
>	2021-04-29T12-56-08	Run 2021-04-29T12-56-08 image set	MIBIcontrol & MIBItracker workflow	View	Download	Û	Modify
>	2021-04-29T12-16-12	Run 2021-04-29T12-16-12 image set	MIBIcontrol & MIBItracker workflow	View	Download	Î	Modify
>	2021-04-28T15-24-20	Run 2021-04-28T15-24-20 image set	MIBIcontrol & MIBItracker workflow	View	Download	Î	Modify
>	2021-04-28T15-22-21	Run 2021-04-28T15-22-21 image set	MIBIcontrol & MIBItracker workflow	View	Download	Û	Modify
1	0 -				1 2 3	4 5	> >>

By default, tables display up to ten rows of information corresponding to the selected tab. You can change the number of rows displayed in the table to 25 or 50 using the drop-down menu below and to the left of each table. Navigate the rows by clicking on the desired page number below and to the right of a table. You can go to the next or previous page in the table by clicking on < or >, respectively. Click on << or >> to jump directly to the first or last page in the list, respectively. The rows in a table can be sorted in a different order by clicking on the column headers. The order can be reversed by clicking on the same column a second time.

Use the **Search** box to find specific row items. You can search on terms present in any of the columns displayed in the table. Click **Reset** to revert to the default display mode.

# **Overlay Display Mode**



The **Overlay** display mode is used to review images representing the quantitative data acquired using the MIBIscope instrument. The display of each image or image set can be customized. Users can select the channels to be overlaid, their relative intensity, pixel smoothing, and channel pseudo-color. All brightness, level, and orientation adjustments will not modify the underlying raw data and are fully reversible. Display settings will be held constant when navigating to another image to enable direct comparison, but they also may be further customized. Visual settings may also be saved for future use. Refer to the <u>Create Image Sets</u> section and the <u>Overlay Display and Control</u> section to learn more about image sets and their visual settings.

**Images** can be exported as MIBItiff files, which can then be analyzed using compatible image analysis software packages such as Halo, Fiji, and VisioPharm.

# Data Management

### Introduction to Resources and Projects

MIBItracker data is organized into Resources and Projects. These groupings are used to control user access to different types of data.

**Resources consist of panels, conjugates, tissues, and instruments.** Users are assigned a Resource access level of Admin, Delete, Modify, Create, Read, or Limited. These permissions

apply to all Resources in the database. An Admin must assign an access level when creating a new user but can change it at any point.

**Projects consist of slides, runs, images, and image sets.** Any user can create a Project except for Limited View users. Limited View users may be granted view access to Projects and they are restricted to view only the data within the Projects. Each Project's Admin can assign users Admin, Edit, or View access to that specific Project.



For both Resources and Projects, each user level includes all the levels below it. For example, Resource Modify users also have access to create and read Resources, and a Project Admin can also View and Edit data in that same Project.

A difference between Resources and Projects is that each user has a single access level to Resources, whereas a user may have Admin access to one Project and View access to another. This enables the same set of panels, conjugates, tissues, and instruments to be used across all Projects, but to retain controlled access to sample and image data within Projects. Please refer to <u>Table 1</u> and <u>Table 2</u> below for information on the actions that can be performed by different access levels to Resources and Projects.

# **Resource Access Levels**

Panels, conjugates, tissues, and instruments fall under Resources and are available to be used in any Project. Below is a table showing the actions that can be performed based on resource access levels.

Tal	b	e	1
ıa		E	

Actions	Limited	Read	Create	Modify	Delete	Admin
View Resources associated with images*	x	х	x	х	x	x
View any Resource		х	x	х	x	x
Create any Resource			x	х	x	x
Modify any Resource				х	х	х
Delete any Resource					Х	Х
Manage users' Resource access						x
Create a Project		х	x	x	x	x

\* Limited users can only see the Resources of images in Projects to which they have Project View access.

# **Project Access Levels**

Projects allow you to organize your data and control who has access to it. The diagram below depicts the relationship between Projects, Slides, Runs, and Images.



When a user creates a Project, they are able to add team members by assigning them one of the following access levels: **Admin, Edit, View**. All users will default to None unless they are specifically added to the Project. Limited View users can only be added with View access to a Project. They cannot edit or administer a Project.

The user who created the Project will default to the Project's Admin. They are able to add other users at Admin level as well. A user cannot change their own access level even if they are an Admin, but another Admin can. Below is a table detailing the permissions associated with each Project access level.

#### Table 2

Actions	None	View (Limited)*	View (Full)	Edit	Admin
See that the Project or any of its data exists		Х	Х	Х	Х
View images/image sets in the Project, including Resources visible in image details		х	x	x	х
View details of slides, sections, and runs in the Project			Х	Х	Х
Add, edit, and remove slides, runs, images, and image sets in the Project				x	x
View, edit, and remove users in the Project*					Х
Duplicate the Project settings including its users					х
Make a Project public to all logged-in users					х
Enable/disable images from the Project to be included in image sets in other Projects					х

\*When users with Limited access to Resources are granted View access to a Project, they can see all its images including the summary info about that image's run and slide as part of the image details, but they cannot search or select runs or slides outside of the image context.

# **Resources Setup**

# Catalog Antibody Conjugates

- 1. On the **Resources** menu, click **Conjugates** to go to the Conjugates page.
- 2. Click **+New** to add a new conjugate to the list.

Add Conjugate	×
ID (Lot)	Target
ID (Lot)	Target
Clone	Mass
Clone	Mass
Element	Stock ug/mL
Element	Stock ug/mL
Rec. ug/mL	Manufactured
Rec. ug/mL	Manufactured
Expires	
Expires	
	Close Save

- 3. Click **New** to add a conjugate, a pop-up will appear. In the **ID** (Lot), box type the lot number of the new conjugate.
- 4. In the **Target** field, type the antigen name.
- 5. In the **Clone** field, type the antibody clone.
- 6. In the Mass field, type the isotope-specific mass number for the metal label.
- 7. In the **Element** field, type the metal tag's chemical symbol (the 1-2 letter abbreviation, for example Au for gold).
- Optionally, in the Stock µg/mL field, enter the concentration of the conjugate stock solution.
- 9. Optionally, in the **Rec. (recommended concentration) μg/mL** field, enter the recommended staining concentration for the conjugate.
- 10. Optionally, in the **Manufactured** field, enter the date on which the antibody was conjugated to the metal tag.
- 11. Optionally, in the **Expires** field, enter the date on which the conjugate expires.

Note: This information can be found in the Antibody Information Sheet of IONpath MIBI reagents.

Alternatively, conjugates can be added using a CSV file.

+	New 👻 💼 🛙	Delete	
	Load conjugate	es from CSV	
	Download conj	ugate template	
6	001	Lamin A/C	
$\bigcirc$	001	Vimentin	

- 1. Click on the dropdown arrow next to the **New** button.
- 2. If you do not have the conjugates template then download it from the **Download conjugate template** option here, and enter all the details for the list of conjugates.
- 3. Save the CSV file, and click Load conjugates from CSV.

Upload Conjugates CSV	
Select Files to Upload Choose File No file chosen Select conjugates CSV to upload	
Submit Cancel	

4. Click **Submit.** The conjugates will be populated in the table under the Conjugates page.

# Panels

### Create a Panel

- 1. On the **Resources** menu, click **Panels** to go to the Panels page.
- 2. Click Create New Panel. Then select From scratch option from the dropdown.

	Panels	Create New Panel -				
			Search	Using selected panel as template From scratch		
	Panel	Name		Manufactured On		
0	63	Full - CD3, 092117	Full panel except for CD3		2017-09-21	
0	62	Full - CD8, 092117	Full panel except for CD8		2017-09-21	
0	61	Full - CD11c, 092117	Full panel except for CD11c		2017-09-21	

Alternatively, select the radio button within the first column of an existing panel in the **Panels** list, then click **Create New Panel**, and then click **Using selected panel as template** to pre-select all conjugates in the template panel. The selections can then be modified by clearing the checkboxes of unwanted conjugate options from the template panel or by selecting additional conjugates listed on the Conjugates page.

3. On the panel template page, in the **Panel Name** box, type the new panel name.

- 4. In the **Date Manufactured** box, select the date on which the panel will be created.
- 5. Optionally, in the **Description** box, enter a description of the panel.
- 6. Optionally, click **Add staining batch** to create an additional panel list with different conjugates.

This function can be used for staining with antibodies that require different incubation times or conditions. Click **Add staining batch** again to add additional staining batches. Click **Remove** to remove any of the additional staining batch lists.

7. On the **Staining Batch 1** pane, in the **Select rows to include in the stain** list by clicking anywhere within the row to be added to the panel.

Use the search function to rapidly parse the conjugates list for specific ones to be included in the new panel. For example, search for "E1L3N" to restrict the table to all PD-L1 [E1L3N] conjugates in the conjugates list.

Selected conjugates											
Z Export Draft Conjugates to CSV											
ID (Lot)	Target	Clone	Mass	Element	Manufactured	Stock ug/mL					
002	dsDNA	3519 DNA	89	Y		500					
002	CD4	Potential Mass Inter	ference:	Nd		500					
001	CD11c	CD4 Hydride (	(143 + 1)	Nd		500					
001	FOXP3			Nd		500					
001	PD-L1	E1L3N	149	Sm		500					

Note: Multiple lots may exist for a single clone.

The **Selected conjugates** pane lists the conjugates selected above. Conjugate

selections with potential mass interferences are tagged with ①. Point to the ① for additional detail about the possible mass interference(s). To learn more about mass interferences refer to the MIBI/O User Guide available under the About Page in MIBItracker.

Repeat the selection process for each of the additional staining batches.

Selected conjugates									
ID (Lot)	Target	Clone	Mass	Element	Manufactured	Stock ug/mL	Rec. ug/mL	Actual ug/mL	Volume (uL)
002	dsDNA	3519 DNA	89	Y		500		2.5	0.00
002	CD4	EPR6855	143	Nd		500		0.5	0.00
001	CD11c 0	EP1347Y	144	Nd		500		5.0	0.00
001	FOXP3	236A/E7	146	Nd		500			
001	PD-L1	E1L3N	149	Sm		500			
	Coo	cktail Volume (uL)	0		Set titers to 1	Template Ti Recomment r and then click apply to ther float (0.5), fraction ( able after you use this of	ter ded Concentration set all titers to a multiple 1/2) or ratio (1:2) format otion. Hit Enter to apply.	e of either the recomme tting is accepted. You m	nded concentration ay still change

- On the Selected Conjugates pane, in the Actual µg/mL column, enter the antibody concentration in micrograms per milliliter to be used in the staining cocktail for each of the conjugates, and then press the return key.
- 9. In the **Cocktail Volume (µL)** box, enter the desired total cocktail volume.

On the **Selected Conjugates** pane, the required volume for each conjugate is then calculated in the **Volume** ( $\mu$ L) column.

Alternatively, if the conjugates include a recommended staining concentration in the **Rec.**  $\mu$ g/mL column, or if you are creating a panel based on an existing panel template, you can enter a multiplication factor in the **Set titers to** box to populate the **Cocktail Volume** ( $\mu$ L). Either float (0.5), fraction (1/2), or ratio (1:2) formatting is accepted. Select **Template Titer** to multiply the template panel titers, or select **Recommended Concentration** to use the **Rec.**  $\mu$ g/mL values, and then press the return key to apply. You can still change individual **Actual**  $\mu$ g/mL values in the table after using this option prior to clicking the Submit button.

10. Click **Export Draft Conjugates to CSV** to save a spreadsheet for the panel being created in a comma-separated values text file format.

The volume per conjugate values in the exported spreadsheet can then be used in the lab to manufacture the antibody panel.

11. Click the **Submit** button to complete Panel creation, or use the **Save Draft** option anytime during this panel creation process to save your work. All the draft panels are listed under the Drafts tab under the **Panels** page.

# **Compare Panels**

1. On the Panels page click on the **Compare** tab.

an	nels (	Drafts Compare			Create	New Pane					
✓ Select panels to compare Choose panel data to compare -											
â		Res									
	Panel ID	Name	Description		Manufactured On	Draft					
9	7	test	draft		2020-03-25						
•	6	test			2020-03-25						
•	5	test2			2020-03-24						
	4	Panel 128 P	Edit a panel		2018-01-26						
Ð		Panel 125 M			2018-01-16						
0	3										
•	3	Panel 120 H			2018-01-16						

- 2. Select the panels from the list of panels to be compared. Draft panels are also listed here.
- 3. As you select you can see the panels being populated below listed by target and by their respective mass and element.
- 4. Optionally, you can include one or more of the data points, listed under the **Choose panel data to compare** dropdown, to be included in the panels to be compared.

Panels	Drafts	Compare		
✓ Select pa Choose panel	anels to c I data to com	ompare	]	
	Clo	one		
🛍 Delete	Lot	:		
	V T	arget		
Panel ID	► Tite	er		Description

#### Advanced Search

- 1. At the bottom of the **Panels** page, click on the **Advanced Search** dropdown.
- 2. Enter the conjugate's Lot number, Target, or Mass.
- Optionally, click the Add Conjugate button to add one or more conjugate to this search, or remove a conjugate by clicking on button.
- 4. By default, **all of the following conjugates** is selected. Optionally, select **any of the following conjugates** option.

<b>v</b> /	❤ Advanced Search							
● all of the following conjugates ◎ any of the following conjugates								
	Lot	Target	Mass					
-	Enter Lot	Enter Target	Enter Mass					
	Lot	Target	Mass					
	Enter Lot	Enter Target	Enter Mass	Add Conjugate				

5. **Search** will return a list of panels with specified conjugate(s), and **Reset** will clear the Advanced Search form.

# **Create Tissue List**

- 1. On the **Resources** menu, click **Tissues** to go to the Tissues page.
- 2. Click **+New** to add a new tissue type to the list.

Add Tissue	×
Organ	Subsite
Organ	Subsite
Diagnosis/Classification	
Diagnosis/Classification	
	Close Save

- 3. On the **Add Tissue** dialog box, in the **Organ** field, enter the organ from which the tissue has been sampled.
- 4. Optionally, in the **Subsite** field, enter the subsite location of the new tissue sample type.
- 5. Optionally, in the **Diagnosis/Classification** field, enter a diagnosis and/or classification for the new tissue type.
- 6. Click Save.

#### Create Instrument List

- 1. On the **Setup** menu, click **Instruments** to go to the Instruments page.
- 2. Click **+New** to add a new instrument name to the list.

Add Instrument	*
Name	
Name	
	Close Save

- 3. On the **Add Row** dialog box, in the **Name** field, enter the new instrument name.
- 4. Click Save.

# **Project Setup**

# **Create a New Project**

- Go to the dropdown under the IONpath logo on the Project Data tab, and choose Create New Project. Alternatively, select Settings in the submenu, and click the Create New Project button.
- 2. Enter a unique name and description for the Project, and assign permission levels for each user. Hit Submit. The new Project is now created.

Project Workfow						
Edit Project Duplicate Project Delete Project						
Name	Description					
Project Workfow	User Guide					
The unique name for your project				le		
Is Public	Optionally provid	some detail about your project Project access levels apply to slidt sections, runs, images and image ests. Ranel, conjugate, tissue and				
Making a project public allows all logged-in users to	Enabling sharing	allows users with access to this	global user settings.			
view its associated data	project to include sets	its images in other project's image		None — User has no access to the project or its data.		
			To add or cha	nge a user's group, click t	View — User can view data in the project but cannot make changes.	.0
				Search	Edit — User can view, create, edit and delete data in the project, but but	
Name		Email		Group	cannot change project settings or users.	
Create User		create@ionpath.com		Project Administrator	Admin – User can view, create, edit	
Delete User		delete@ionpath.com		Project Edit	<ul> <li>and delete data, settings, and user access in the project.</li> </ul>	
Modify User		modify@ionpath.com		Project View		
10 •						1

Accession slides

- 1. On the **Project Data** menu, click **Slides** to go to the Slides page.
- 2. Click Accession New Slide to create a new slide.

Project A 🚽	Slides	Sections	Runs	Images	Image Sets	Settings					
Project     Slide Name/External ID       1: Project A     Enter the slide name here       Location     © Slide or block       Enter storage location     © Slide or block received from external partner       Description     © Midslide       Uncoated glass slide (not compatible with MiBlscope)     Loc       Enter slide lot     Enter slide lot											
						li	Enter slide lot				
+Add Section											
Block		Position		Date	e Created	D	ate Type	Tissue	Description		
						There is no	lata to display				
Submit Cancel											

- In the **Project** box select a project to which the slide is to be assigned. If the Project dropdown filter is set to a project, this field will default to that project. Click in the **Project** box to bring up a list of projects available. Alternatively, start typing to reduce the number of options with type-ahead searching.
- 4. Optionally, in the **Location** box, enter a storage location for the slide.
- 5. Optionally, in the **Description** box, enter a description of the slide for later reference.
- 6. Optionally, in the **Slide Name/External ID** box, enter an ID/slide label in addition to the MIBItracker-assigned ID.

**Note:** When setting up a run at the MIBIscope using MIBIcontrol, this field will be available/searchable during sample exchange under the **Slide** dropdown, along with the MIBItracker assigned ID.

7. By default, a newly added slide is designated as a slide created from internal tissue block.

Alternatively, click on **Slide received from an external partner** for slides originating outside of your institution/lab. This will add a Source field which can then be optionally populated with the relevant information.

8. By default, a newly added slide is designated as a MIBIscope-compatible MIBIslide.

Alternatively, click on the **Un-coated glass slide** for standard glass microscope slides. This option is useful for cataloging H&E and/or standard IHC slides.

9. In the **Lot** box, enter the lot number of the gold-coated slide, which is printed on the packaging.

Note: The Lot box is only available when the Gold-coated slide option is selected in step 7.

10. Click **+Add Section** to begin assigning the first tissue section to the new slide. When attempting to submit a slide without a section MIBItraker will display the following warning. This warning can be dismissed to continue to create a slide.

This slide does not have any sections and thus cannot be assigned a panel. Do you want to continue?									
Cancel									
Note: Make s will enable th MIBItracker a	sure to add a sectio e successful opera fter analysis.	on for a slide. Th ttion of the MIBIs	is is necessary fo scope and automa	r a panel to be a tically upload th	assigned to a section. e correct data to	This			
+Add Section									
Block	Position	Date Created	Date Type	Tiesuo	Description				

	Block	Position	Date Created	Date Type	Tissue	Description		
	CB4	Тор	2018-08-15	Cut Date	Tonsil [Unremarkable]	Additional details c	0	1
Submit	Cancel							

- 11. On the sections table, select the cell under the **Block** column header, enter an identifier for the block from which the section has been cut, and then press the return key.
- 12. Select the cell under the **Position** column header, enter the relative location of the section on the slide for multi-section slides, and then press the return key.

We recommend using a consistent nomenclature across slides, projects, and users. For example, use 'Top', 'Middle', and 'Bottom', with a reference point such as the label agreed upon by all users.

ate Created						Date	Туре	Tissue	
mm/d	ld/yyy	у		0	•	Cut I	Pate	Tonsil [Unrema	
August 2018 ▼									
Sun	Mon	Tue	Wed	Thu	Fri	Sat			
29	30	31	1	2	3	4			
5	6	7	8	9	10	11			
12	13	14	15	16	17	18			
19	20	21	22	23	24	25			
26	27	28	29	30	31	1			

13. Click the cell under the **Date Created** column header, and then select the date on which the slide was created using the calendar dialog.

Date Created	Date Type
2018-08-15	✓ Cut Date
	Date Received

14. Click the cell under the **Date Type** column header to define what the creation date entered in step 12 represents.

The **Cut Date** option is recommended for slides created internally, while Date Received can be used for slides sourced externally.

15. Select the cell under the **Tissue** column header, enter the organ or tissue type the section represents, and then press the return key.

For multi-tissue TMA sections, this field should be left blank, and the tissue type specified at the FOV/image level.

- 16. Optionally, select the cell under the **Description** column header, enter any additional information related to the section, and then press the return key.
- 17. Click **+Add Section** to assign an additional tissue section to the slide, and repeat steps 10 through 16 for each additional section to be added to the slide
- 18. Once all sections have been added to the slide, click **Submit** to add the new slide ID to the MIBItracker database.

Duplicate Slide Act	cession New Slide Edit Slide 16								
Project	roject				Slide Name/External ID				
4: Project D	4: Project D				Enter the s	lide name here			
Location Ionpath					Silde created from internal tissue block Silde or block received from external partner				
Description					Source				
Demo					Enter exter	Enter external source			
				le	MIBIslide				
					<ul> <li>Un-coated</li> </ul>	d glass slide (not compatible with	n MIBIscope)		
					Lot				
					Enter slide	lot			
Sections Added to SI	ide 16								
Block	Position on Slide	Date Created	Panel ID	Panel Name		Date Stained	Description		
Demo	top	2020-05-17					Demo		

Once the slide has been added to the MIBItracker database the slide details page appears with options to Duplicate Slide, Accession New Slide, and Edit Slide #.

# **Project Workflow**

# Manage Project Settings

1. On the project details page, the logged-in user will see their access level under the Project name on the upper left.

🌎 IONPATH	Project Da	ita R	esources						
All Projects	-	Slides	Sections	Runs	Images	Image Sets	Settings		
MIBIcontro Project ID: 34 Cole: Project Admi	MIBIcontrol & MIBItracker workflow         voject ID: 34         Gre: Project Administrator         Edit Project       Duplicate Project								
	Name Description								
Name				Descript	ion				
Name MIBIcontrol & M	IBItracker workflo	w		Descript MIBI so	ion oftware workflov	v and data visualizatio	on		
Name MIBIcontrol & M The unique name	IBItracker workflo	w		Descript MIBI so Optionall	ion oftware workflow y provide some	v and data visualization	on	ħ	
Name MIBIcontrol & M The unique name	IBitracker workflor	w		Descript MIBI so Optionally	ion oftware workflow y provide some e Share Enable	v and data visualizatio detail about your proj vd	on ject	h	

- In View mode, a Project Admin will only see the users who have access listed in the table. In Edit and Create mode they will see and be able to choose from all available users. Only Project admins can access Edit mode in existing Projects.
- In Edit and Create mode, Project admins can enable Is Public option for a Project which means all the data including the runs, images, and image sets associated with that Project will be available for any logged-in user who has access to MIBItracker regardless of their permission level.
- In Edit and Create mode, Project admins can enable the <u>Image Share</u> option which allows users with Edit or Admin access to create image sets from this Project to be shared with another Project.
- 5. Duplicate Project will create a new project including users at the same access level as the previous Project as long as the logged-in user had admin access to the original Project. Otherwise project users are not copied over in the duplication process. The new Project can be edited, and Submit will create it.

# **Assign Slides**

 Make sure to add a slide (Project Data menu → Slides → Accession New Slide) and associate it with a Project. The Project dropdown list will only show those Projects for which you have Edit or Admin access.

Project	
Choose a project	
Project Three	
Project Two	
Project One	

 Assign a panel to the section(s) on the slide (Resources menu → Panels → Choose a Panel → Sections → Edit Section Assignment). The list of sections is filtered by the Projects to which you have admin and edit access.

Panel 120 H	Edit Usa	as template Download CSV					< >
Manufactured: 2018-01-16							
Total volume: 100.00 µL							
Antibody volume: 3.07 µL							
Buffer volume: 96.93 µL							
Conjugates Sections							
Edit Section Assignment							
					Search		Reset
Project	Slide	Block	Position	Date Created	Date Stained	Panel	
Project C	3	TMA17-6	Bottom	2017-11-29	2018-01-16	Panel 120 H	
10 -							1

# Add a Run

- 1. Go to the Data menu and select Runs.
- 2. Click Create a New Run. Upload the Run XML/JSON file.

**Note:** If you are using a commercial MIBIcope the FOVs are automatically uploaded to MIBItracker as long as the slide is associated with a project and has a panel assigned to it. In an event where these uploads fail, use a FOV **JSON** file (available in the local directory) to create a Run, and upload the images. You only need to do this for one FOV in the run, after which you can upload additional TIFFs to that run.

To learn more about run setup in MIBIcontrol, please refer to the MIBIscope User Guide.

- In the Project field select a project to which the run is to be assigned. Click in the Project box to bring up a list of projects available. Alternatively, start typing to reduce the number of options with type-ahead searching.
- 4. The slides will now be filtered to only those in the selected Project. If you do not see the correct slide, you need to either move that slide to this Project, or select another Project for this run.
- 5. In the **Instrument** field select the instrument with which the Images were acquired.
- 6. In the FOV Size field enter the size of the field of view acquired.

Note: This field is not applicable for commercial MIBIscope users.

- 7. If the **Run XML/JSON** is uploaded the **Label** field will be prepopulated. Change this to use a unique label that is different than the default label provided by the run settings file.
- 8. **Submit** will create this run.
- 9. A new page will appear where **Section**, **Tissue SED** image, and **Description** can be added to each FOV in the run.

# Edit a Run

Users with Admin and Edit access to a project can edit an existing run.

- 1. Go to Project Data and select Runs.
- 2. From the list of runs select the run to be edited.
- 3. On the run details page, click Edit dropdown, and select Edit Run.
  - a. The editable fields are **Project**, **Slides**, **Instrument**, **Label**, **and Description**
  - b. Click Submit.
- 4. On the run details page, click Edit dropdown, and select Edit Images.
  - a. The editable fields are **Section**, **Tissue**, **Description**, and **SED** Image.
  - b. Click Update.

#### Download

Here the files associated with a run can be downloaded.

**Run metadata CSV** — Details related to Run setup which includes the FOV size, Frame size, Tissue type, etc.

**Ion counts CSV** — Contains target, mass, and their corresponding ion counts.

Run settings file — XML that has all the run parameters.

### Upload Images to an Existing Run

Images processed using MIBI/O can be added to existing **Runs** in MIBItracker. This is useful especially when the images have undergone some processing such as filtering, isobaric correction, or using MIBI/O.

**Note:** To learn more about MIBI/O go to the About page on MIBItracker to find the links to download the MIBI/O application and the user guide.

- 1. Go to **Project Data**, and choose **Runs**.
- 2. Select the run to which the images need to be added.
- 3. Select **Upload Images** to choose the tiffs images to be uploaded.
- 4. Select **Upload Images** to upload the selected images.
- 5. Images that were mass corrected and/or filtered using MIB/O will be added here with updated FOV-IDs such as Point 1-Filtered.

**Note:** Alternatively, images can be uploaded directly from **MIBI/O**. To learn more about this, refer to the MIBI/O User Guide. This feature is available on **MIBI/O v1.10** and above.

# Move Runs, Slides, or Image Sets from One Project to Another

To move Runs or Slides from one project to another project.

- 1. Select the item to be moved, and click **Edit Slide** or **Edit Run**.
- 2. Click on the **Project** field to choose the destination project from the dropdown.
- 3. A warning is displayed with the associated runs, slides, and image sets affected by this move. You may continue to edit the item or cancel the move after viewing this warning.
- 4. Click **Submit** to finalize the move.

Confirm Project Change
Moving Run 20180122_1242_1245 from project Project D to project Project C will also move the following items and may affect which users can access them.
Images Sets: 20180122_1242_1245 C Are you sure you want to proceed? Changes are not finalized until you submit the underlying form.
Continue Editing Reset Project

To move Image sets.

- 1. On the **Image Sets** page, select the image set to be moved to another project.
- 2. Click on the **Project field** to choose the destination project from the dropdown.
- 3. Hit **Enter** on the keyboard. A warning is displayed with the associated runs, slides, and image sets affected by this move. You may continue or cancel the move after viewing this warning.
- 4. Click **Submit Changes** to finalize the move.

# Image Sets

#### **View Image Sets**

An image set containing all images in a run is automatically created when the run images are uploaded.

1. On the **Project Data** menu, click **Image Sets** to go to the Image Sets page.

2. Click **View** to go to the Overlay Image Display page for the first image in the selected image set.

# Field of View Information

Information for an image can be found in the **Image Details** tab right next to the Overlay Settings. It shows several important properties pertaining to the current FOV.

Overlay Settings Image Details	Channel Thumbnails Panel Details
Project: Project C	
<b>Run:</b> 20180121_1250_1251 🕑	
<b>FOV Size:</b> 500 μm	
# Depths: 4	
Dwell Time: 4	
<b>Frame Size:</b> 1024 (0.49 µm per	pixel)
Imaging Preset:	
Lens1 Voltage:	
Slide: 5 Bottom 岱	
Panel: Panel 128 P 岱	
Tissue: Tonsil [Unremarkable]	
Instrument: lonpath1	
Description:	The second s

The **Run**, **Slide**, and **Section** from which the current FOV was acquired, as well as the **Panel** name with which it was stained, are linked to the detailed view of those database items. Click I next to the label to open a new tab with the respective detail view.

The **Project** name, **FOV Size** in microns, the **Frame Size** in pixels, and details pertaining to the image acquisition conditions, such as the number of **Depths** (scans) imaged, the ion beam **Dwell Time** per depth in milliseconds, and the **Imaging Preset** used, are also displayed.

The secondary electron detection (SED) image thumbnail is displayed if available. The **SED image** gives the user a general indication of the morphology present in each FOV.



In the upper-right corner of the FOV information pane, click **Downloads** to download a multi-layer TIFF file for the current FOV for image analysis.

A notification banner will be displayed while the images are being prepared for download. Once the compressed folder with the files is ready, the notification banner will contain a **Download** button.

Click  $\uparrow$  to upload image segmentation or results mask images in PNG format. Once uploaded, the masks will be selectable as a channel selection.

# **Overlay Display and Controls**

Image sets are used to group FOVs acquired in the same run or related images from separate runs. The image overlay view displays a single FOV at a time. An image set containing all images in a run is automatically created when run images are uploaded. The run image sets are visible to all users who can access that Project.

Image Set:	My new set 🗸	Image Selection:	20190308_2169_217	70: Point8 <del>-</del>	<	>
Show Scale	۹ 🌑		1x	⊖ C ↔	1	Reset

The **Image Set** field lists additional image sets to which the current FOV belongs. Select a different set to load it.

The image set controls on the right of the panel are used to switch among the FOVs that are part of the same image set while maintaining consistent overlay control settings to enable visually comparing the images in terms of relative intensity.

Imaga Salaatian:		
2020-01-16T17-53-57 FTC 0.08:	<u> </u>	
2020-01-16T17-53-57 FTC 0.08 <sup>,</sup> FOV1		
2020-01-16T17-53-57_FTC_0.08: FOV2 ව උ ↔	î	Reset

From the dropdown select another FOV that is part of the current image set to load its overlay view. Alternatively, click to load the next FOV in the image set, or click to load the previous FOV in the image set.

#### **Overlay Display**

fov-1-scan-1: fov-1-scan-1
Image Set:         Image Selection:           2019-11-14T10-53-04         2019-11-14T10-53-04_MIBIcontrol
Show Scale Q ● 1x O C ↔ I Reset
Image Channels Image Details Grayscale Channels Panel Details
dsDNA V CD45 V X Smooth Smooth
Brighten -1 0 1 Brighten -1 0 1
Range 2 34 Range 1 23 Hue Cyan Hue Magenta

Click **Show Scale** to display a scale bar in the lower left corner of the overlay image. The scale is automatically adjusted based on the zoom level applied to the image.

The overlay image can be zoomed using either the scroll bar below the image or by using the mouse wheel/laptop touchpad pinching gesture. Click **Reset** to show the entire FOV.

Right-click the overlay image to **Save** or **Copy** the displayed image.

Click  $\mathfrak{I}$  to rotate the image counterclockwise, or  $\mathfrak{C}$  to rotate clockwise. Click  $\leftrightarrow$  to mirror

the image on its horizontal axis or I to mirror the image on its vertical axis. Click **Reset** to revert to the original image orientation.



#### **Overlay Settings**

Use the channel drop-down menu to select an available channel to be displayed on the overlay view. The channel names are defined from the panel associated with each imported image set. To add more channels to the overlay image, click **Add image channel**. Up to nine channels and masks can be displayed concurrently.

#### Range

Set a minimum and maximum count value to display, where pixel counts outside of this range are capped at the threshold value. Raising the minimum value of the range sets all pixels with counts below it to zero. Lowering the maximum value of the range fully saturates all pixels with counts above it.

The default values below the slider display range from one to the maximum per pixel value in the FOV displayed. When moving to a different FOV within the same image set, the selected minimum and maximum values will remain fixed. However, the newly displayed FOV may have a higher maximum count value, and thus the available selection range may increase.

Note: The intensity values are independent across channels.

#### Smooth

Apply a smoothing filter to the channel image. Drag the slider to the right to increase the radius of the filter. This setting can produce more visually appealing illustration images.

#### Brighten

The **Brighten** slider is set to zero by default. Increase the intensity of the displayed channel by dragging the slider to the right toward a setting value of 1. Decrease the intensity of the displayed channel by dragging the slider to the left toward a setting value of -1. The setting values displayed below the slider indicate the available setting range and not the currently selected value. A value of -1 subtracts the maximum value possible from all pixels; a value of 1 fully saturates all nonzero pixels.

#### Hue

Select a color to be assigned to the selected channel in the overlay.

Note: The raw data is a grayscale map of pixel intensities.

#### **Visual Settings**

The selection of Image Channels and their settings can be changed and saved for an image set. When the FOVs are viewed these saved Visual Settings will be available across the Image Set.

Overlay Settings Image Details		Channel Thumbnails	Panel Details						
Select Saved S	Setting <del>-</del>			+	C2	A MAIL	~	×	

Visual Settings can be created, modified, and deleted based on the user's access level to a

project. Resource users with access to the project can create, modify, and delete their saved visual settings. The settings they create are available to everyone with access to the project. Limited users with access to a project and resource users viewing a public project may also create additional settings for their individual use, but these are not visible to other users.

Select to enter the name for a setting and click **Submit**. This visual setting will now be available in the **Select Saved Setting** dropdown. Select to reload the selected setting. Select to edit the current setting. Select to update the changes to the current setting. Select to delete the current setting.



Visual settings created by a logged in user appears above the line, and settings created by other project members appear below the line.

### **Download Image Sets**

- 1. On the **Project Data** menu, click **Image Sets** to go to the Image Sets page.
- 2. Click **Download** to create a compressed .zip file containing the multi-layer TIFF files for all images in the selected image set.

A notification banner will be displayed while the images are being prepared for download. This may take up to several minutes for large image sets. Once the compressed folder with the TIFF files is ready, the notification banner will contain a **Download** button. You can navigate to other pages while the images are being prepared for download.

3. Click **Download**, and select the destination folder for the compressed .zip file.

### **Create Image Sets**

Image Sets are visible to users who have permission to view a Project.

On the **Project Data** menu, click **Images** to go to the Images page.

Alternatively, on the Image Sets page, click **Create Image Set** to go to the Images page.

1. Click **+New Image Set** to go to the image selection page.

+	New Image Set												
Se	elect a project and images to add	I to image set										Create Image Set	× Cancel
Pr	oject	Image Set Name				Image Set Description							
	34: MIBIcontrol & MIBItracker workflow	DeMo				Optional: A more deta	iled description of this image	e set					
Select the project this imageset will be associated with													
	Notify Project Members												
Se	lect to email all project members about th	is addition.											
	Book												
-	Run	Project	FOV Name	FOV ID	Panel			Tissue	•	Run Date		Instrument	
	2021-04-08v142-2	MIBIcontrol & MIBItracker workflow	FOV1	FOV1	20191111 - P022	_LOO_1		Lymph	Node [Metastatic Melanoma]	2021-04-0	8	Pete	
	2021-04-08v142	MIBIcontrol & MIBItracker workflow	FOV1	FOV1	20191111 - P022	_L00_1		Lymph	Node [Metastatic Melanoma]	2021-04-0	8	Pete	
	2020-12-03T12-30-07	MIBIcontrol & MIBItracker workflow	FOV1-backup	FOV1-backup	Immuno-12 Lyo 2	2 Year Stability				2020-12-0	3	Pete	
D	2020-12-03T12-30-07	MIBIcontrol & MIBItracker workflow	FOV1	FOV1	Immuno-12 Lyo 2	2 Year Stability				2020-12-0	3	Pete	
	2020-12-02T17-04-44_limiter_remo	MIBIcontrol & MIBItracker workflow	FOV3	FOV3	Immuno-12 Lyo 2	2 Year Stability				2020-12-0	2	Pete	
	2020-12-02T17-04-44_limiter_remo	MIBIcontrol & MIBItracker workflow	FOV2	FOV2	Immuno-12 Lyo 2 Year Stability				2020-12-0	2	Pete		
D	2020-11-25T11-42-30	MIBIcontrol & MIBItracker workflow	FOV2	FOV2	Immuno-12 Lyo 2 Year Stability		1		2020-11-2	5	Pete		
D	2020-11-25T11-42-30	MIBIcontrol & MIBItracker workflow	FOV1	FOV1	Immuno-12 Lyo 2	2 Year Stability				2020-11-2	5	Pete	
D	2020-11-21T19-01-16repetetsting1_4	MIBIcontrol & MIBItracker workflow	FOV1vv	FOV1-MassCorrected-Filteredn	Immuno-12 Lyo 2	2 Year Stability				2020-11-2	1	Pete	
D	2020-11-21T19-01-16repetetsting1_4	MIBIcontrol & MIBItracker workflow	FOV1v	FOV1-MassCorrected-Filtered	Immuno-12 Lyo 2	2 Year Stability				2020-11-2	1	Pete	
1	10 -										< 1	2 3 4 5	5 > >>
~	Advanced Search												
R	in Name	FOV Name	Pa	nel Name		Tissue			Silde		Instrument		
Enter Run Name Enter FOV Name			Enter Panel Name		Enter Tissue			Enter Slide		Enter Instrument			
Run Start Date Run End Date		Im	age Status		Conjugates all of the following co	uniunates  any of the follo	wina coni	unates					
YYYY-MM-DD × YYYY-MM-DD ×		× /	wallacie*		Enter Tarnet	Enter Mass	Add Core	ucate					
									Searc	h Reset			

- 2. Choose a project from **Project dropdown** to list its images.
- 3. In the Image Set Name box, type in a name for the new image set.
- 4. Optionally, in the **Image Set Description** box, type in a description or other pertinent details.

This field can be useful when sharing custom image sets with another user to indicate what is being shared and why.

- 5. Enable **Notify Project Members** to notify the project members once this image set is created.
- 6. Select the checkbox in the first column of the image list for each image to be added to the image set, and then click **Create Image Set**.

#### Share Images

#### Granting Access via the Project

If you want to share all images in the Project with another user, any Project admin can simply add them as a View user to the Project. As outlined in Table 2, this will either allow them to see all Project data, unless they are a Limited Resource user in which case only the images and their details are accessible.

#### Granting Access via Creating Image Sets in Another Project

If you want to share only a subset of the images from a Project, or do not want to grant full access to slides and runs in the Project, then there is an option to accomplish this by creating an image set containing these images in another Project. This requires that the original Project in which the images are saved has Image Sharing enabled. Only Project admins can change this setting.

#### For Projects with Image Sharing Enabled

- 1. Create a new Project through which you want to share the images, and grant the relevant users View access.
- 2. Go to **Image Set**, under the **Data menu**.
- 3. Click **Create Image Set**. Select the Project you've designated, and fill in the name and description.
- 4. Select the images from the original Project that you wish to include.
- 5. Once the images are chosen click **Create Imageset**.
- 6. This image set will now appear under your new Project.

If an admin of the original Project disables sharing, the images from that Project will be removed from image sets in other Projects.

#### **User Name**

The user name menu in the upper right corner of MIBItracker contains a link to the **Profile** and **About** pages. The **Logout** menu item can be used to sign out of MIBItracker.

#### **Profile Page**

Use the profile page to change your password.

Current Password:	Current Password	P
New Password:	New Password	<b>(</b>
	Your password must be at least 8 characters long, and mu case, upper case, numeric and special characters.	ist contain at least two of lower
Confirm New Password:	Confirm New Password	۲
Organization:	lonpath	
Update		

- 1. In the **Current Password** field, type in your current password.
- 2. In the **New Password** field, type in the new password that you want to set. **Note:** Passwords must be at least 8 characters long with 2 complex cases.
- 3. In the **Confirm New Password** field, re-type the password that you want to change to, and then click **Update**.

The password entered into the **Confirm New Password** field must match the one entered into the **New Password** field.

4. Optionally, in the **Organization** field, type in the name of your organization.

#### About Page

The **About** page lists the current MIBItracker version and a link to download the current MIBI/O software. It also displays the link that needs to be copied and pasted to the *MIBItrackerURL* field under MIBI/O settings. This is essential to enable the upload of images from MIBI/O to MIBItracker.

It also lists the support information and links to download a copy of the MIBItracker and MIBI/O user manual.



# **MIBItracker Pages**

The MIBItracker navigation bar contains links to all database lists. Each of the pages is described in detail in this section. On most lists, click on a row to access a detailed view of the listed item.

Note: Some functions and buttons may be unavailable depending on your user account privilege level.

# Project Data

💙 ΙΟΝΡΑΤΗ	Project Da	ata F	Resources				
All Projects	•	Slides	Sections	Runs	Images	Image Sets	Settings

The Project Data menu contains links to the Project Settings, Image Sets, Runs, Slides, Images, and Sections.

### **Projects Page**

The **Projects** page lists all projects to which slides, sections, and panels can be assigned. There is a search bar on the top where the projects can be searched based on Name, ID, Created By, and Last Modified.

#### ID

The **ID** field is automatically generated by the database when a new project is created. It can be used for anonymized labeling of the slides belonging to a given project.

#### Name

The Name field is the label given by the user to a project.

### Image Sets Page

The **Image Sets** page lists all available image sets. An image set is created automatically for all FOVs in a run when it is uploaded to MIBItracker.

MIBI	control & MI Slides Sections Runs	s Images Image Sets Settings				
Creat	te image Set					
				Search		Reset
	Name	Description	Project	View Images	Download Images Delete	Modify
>	2021-04-28T10-58-03	Run 2021-04-28T10-58-03 image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
>	2021-04-28T10-57-16	Run 2021-04-28T10-57-16 image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
>	2021-04-28T10-56-11	Run 2021-04-28T10-56-11 image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
>	2021-04-28T10-54-34	Run 2021-04-28T10-54-34 image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
>	2021-04-28T10-53-07	Run 2021-04-28T10-53-07 image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
>	2021-04-27T17-43-45	Run 2021-04-27T17-43-45 image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
>	2021-04-27T17-42-10	Run 2021-04-27T17-42-10 image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
>	2021-04-27T17-41-18	Run 2021-04-27T17-41-18 image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
>	2021-04-27T17-40-16	Run 2021-04-27T17-40-16 Image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
>	2021-04-27T17-39-24	Run 2021-04-27T17-39-24 image set	MIBIcontrol & MIBItracker workflow	View	Download	Modify
10	•				< 1 2 3 4 5	> >>

The image sets list contains the following columns, and can be sorted on any of them by clicking on the column header. Click **View** to open the image set in **Overlay** view. Click **Download** to download a zip file containing a multi-layer TIFF for each image in the image set. It may take some time for the TIFF download to prepare, but you may continue to browse to other MIBItracker pages during the preparation without interrupting the process. A notification banner will let you know when the images are ready to download.

#### Name

The **Name** field is either automatically generated by the database using the run name from which the images in the set have been imported, or it may be manually assigned by the user when creating custom image sets.

#### Description

The **Description** field is either automatically generated by the database using the run name from which the images in the set have been imported, or it may be manually assigned by the user when creating custom image sets.

### **Runs Page**

The **Runs** page lists the acquisition sessions uploaded to MIBItracker and allows for creating new acquisition runs.

MIBIcontrol & MI Slides Section	ns Runs Images Image Sets Settings	S		
Create New Run				
1 Delete			Search	Reset
Name	Label	Run Date	Project	Instrument
O 2021-04-28T10-58-03	2021-04-28T10-58-03	2021-04-28	MIBIcontrol & MIBItracker workflow	Pete
0 2021-04-28T10-57-16	2021-04-28T10-57-16	2021-04-28	MIBIcontrol & MIBItracker workflow	Pete
0 2021-04-28T10-56-11	11-04-28T10-56-11 2021-04-28 10-56-11 MiBicontrol &		MIBIcontrol & MIBItracker workflow	Pete
0 2021-04-28T10-54-34	2021-04-28T10-54-34	2021-04-28	MIBIcontrol & MIBItracker workflow	Pete
0 2021-04-28T10-53-07	2021-04-28T10-53-07	2021-04-28	MIBIcontrol & MIBItracker workflow	Pete
0 2021-04-27T17-43-45	2021-04-27T17-43-45	2021-04-27	MIBIcontrol & MIBItracker workflow	Pete
0 2021-04-27T17-42-10	2021-04-27T17-42-10	2021-04-27	MIBIcontrol & MIBItracker workflow	Pete
0 2021-04-27T17-41-18	2021-04-27T17-41-18	2021-04-27	MIBIcontrol & MIBItracker workflow	Pete
0 2021-04-27T17-40-16	2021-04-27T17-40-16	2021-04-27	MIBIcontrol & MIBItracker workflow	Pete
0 2021-04-27T17-39-24	2021-04-27T17-39-24 2021-04-27 MIBIcontrol & MIBItracker workflow		Pete	
10 -				< 1 2 3 4 5 > >>

The runs list contains the following columns and can be sorted by any of them by clicking on the column header. Click on a row to display, edit, or download information specific to a single run. Please refer to the <u>Upload and Manage Runs</u> section for more information on how to edit a run.

#### ID

The **ID** column displays the acquisition run name in which the image has been acquired. A run is a single MIBIscope acquisition session comprising one or two slides. The run name is generated automatically from the *.xml* file name.

#### Name

The **Name** is the custom label assigned by the user. It may be different from the run .xml file name.

#### Run Date

The **Run Date** is the date on which an image has been acquired. The images are sorted on the run date by default, with the most recently acquired images listed first. The date is automatically extracted from the run .xml file.

#### Instrument

The Instrument column specifies which instrument was used to acquire the run.

### Slides Page

The **Slides** page lists all slides that have been accessioned into the database.

demo													
м	MIBIcontrol & MI  Sildes Sections Runs Images Image Sets Settings												
A	Accession New Slide												
	Delete								Search			Reset	
	ID	Project			Project ID	Source	External ID	Description	Location	Slide Type	Lot		
C	6286	MIBIcontrol & MIBItracker workflow			34		3421				coated		
С	5340	MIBIcontrol & MIBItracker	workflow		34		12345, test slide				coated		

The slides list contains the following columns and can be sorted by any of them by clicking on the column header. Click on a row to display, edit, or download information specific to a single section.

#### ID

The slide **ID** field is automatically generated by the database when the slide is first created. The slide identification number is useful for anonymized labeling of slides.

#### Project

The **Project** field is linked to the <u>Projects</u> list and is used to assign the section to a specific project. Each section is linked to a single project only.

#### **Project ID**

The **Project ID** field is automatically generated by the database when a new project is created. The project identification number is useful for anonymized labeling of slides.

#### Source

The **Source** field is used to track external partners from whom the slide has been obtained. This field is only used for externally sourced slides.

#### External ID

The **External ID** field is used to track the label assigned to the slide by an external provider. This field is optional.

#### Location

The **Location** field is used to record the storage location of a slide after it has been stained. We recommend storing slides under vacuum.

#### Slide Type

The **Slide Type** field is used to indicate whether the slide is coated with a conductive material for use in the MIBIscope system or uncoated.

#### Lot

The **Lot** field is used to track the lot number of coated slides. It is not available and will always be blank for uncoated slides.

### **Images Page**

The **Images** page lists all acquired FOVs. Each row of the data table represents a single FOV. Click on any row to go to the <u>overlay display mode</u> for a particular image.

٢	IONPATH Project Da	ata Resources						demo.use	r@ionpath.com -
м	Bicontrol & MI	Slides Sections	Runs Images	Image Sets Settir	ıgs				
+	- New Image Set								
1 Deles Search									
	Run	Project	FOV Name	FOV ID	Panel	Tissue		Run Date	Instrument
	2021-04-08v142-2	MIBIcontrol & MIBItracker	FOV1	FOV1	20191111 - P022_LOO_1	Lymp	h Node [Metastatic Melanoma]	2021-04-08	Pete
	2021-04-08v142	MIBIcontrol & MIBItracker	FOV1	FOV1	20191111 - P022_LOO_1	Lymp	h Node [Metastatic Melanoma]	2021-04-08	Pete
	2020-12-03T12-30-07	MIBIcontrol & MIBItracker	FOV1-backup	FOV1-backup	Immuno-12 Lyo 2 Year Stability			2020-12-03	Pete
	2020-12-03T12-30-07	MIBIcontrol & MIBItracker	FOV1	FOV1	Immuno-12 Lyo 2 Year Stability			2020-12-03	Pete
	2020-12-02T17-04-44_lim	MIBIcontrol & MIBItracker	FOV3	FOV3	Immuno-12 Lyo 2 Year Stability			2020-12-02	Pete
	2020-12-02T17-04-44_lim	MIBIcontrol & MIBItracker	FOV2	FOV2	Immuno-12 Lyo 2 Year Stability			2020-12-02	Pete
	2020-11-25T11-42-30	MIBIcontrol & MIBItracker	FOV2	FOV2	Immuno-12 Lyo 2 Year Stability			2020-11-25	Pete
0	2020-11-25T11-42-30	MIBIcontrol & MIBItracker	FOV1	FOV1	Immuno-12 Lyo 2 Year Stability			2020-11-25	Pete
0	2020-11-21T19-01-16rep	MIBIcontrol & MIBItracker	FOV1vv	FOV1-MassCorrected	Immuno-12 Lyo 2 Year Stability			2020-11-21	Pete
	2020-11-21T19-01-16rep	MIBIcontrol & MIBItracker	FOV1v	FOV1-MassCorrected	Immuno-12 Lyo 2 Year Stability			2020-11-21	Pete
	10 -							< 1 2	3 4 5 > >>
>	Advanced Search								

The **Images** list contains the following columns and can be sorted on any of them by clicking on the column header. The **Advanced Search** pane allows searching on one or more of the fields. Click on **Advanced Search** to reveal all searchable fields.

#### Run

The **Run** column displays the acquisition run in which the image has been acquired. A run is a single MIBIscope acquisition session comprising one or two slides. The run name is generated automatically from the .xml file name.

#### Point Name

The **Point Name** is a custom label assigned by the user to each image during data acquisition.

#### Point ID

The **Point ID** is the label automatically assigned to the image by the MIBIscope software.

#### Panel

A **Panel** is the group of conjugated antibodies (**Conjugates**) with which a slide and/or section has been stained. The **Conjugates** define the specific channels available for each image.

#### Tissue

A tissue type defined on the **Tissues** page can be assigned to each section. If an FOV is part of a tissue microarray (TMA) with multiple tissue types, this field may be blank.

#### Run Date

The **Run Date** is the date on which an image has been acquired. The images are sorted on the run date by default, with the most recently acquired images listed first. The date is automatically extracted from the run .xml file.

### **Sections Page**

The **Sections** page lists all sectioned tissue samples in the database.

All	Projects -	Slides Section	ns Runs Imag	ges Image Sets	Settings				
Í	ř Delete						Search		Reset
	Slide	Block	Position	Date Created	Tissue	Panel		Date Stained	Project
0	6286 [3421]	Test	Bottom	2021-04-08	Lymph Node [Metastatic Melanoma]	20191111 - P022	_LOO_1		MIBIcontrol & MIBItra
0	6286 [3421]	Test	Тор	2021-04-08	Lymph Node [Metastatic Melanoma]	20191111 - P022	_LOO_1		MIBIcontrol & MIBItra

The sections list contains the following columns and can be sorted on any of them by clicking on the column header. Click on a row to display, edit, or download information specific to a single section.

#### Slide

The **Slide** field is linked to the <u>Slides</u> list and indicates the slide on which the section is placed. A section can be linked to one slide only, but one slide can hold multiple sections.

#### Block

The tissue block from which the section has been cut.

#### Position

The Position field indicates the location of a section on a slide holding multiple sections. We recommend settling on a standard nomenclature such as top, middle, and bottom, with a standard reference point such as the label.

#### **Date Created**

The Date Created field typically refers to the date on which the section has been cut from block, but could also refer to the date a slide was received from an external source.

#### Tissue

The Tissue field is linked to the <u>Tissues</u> list and is used to describe the section's tissue type. If the section is a tissue microarray composed of multiple tissue types, this field can be left blank.

#### Panel

The Panel field is linked to the <u>Panels</u> list. It indicates which panel of conjugates was used to stain the section.

#### **Date Stained**

The Date Stained field indicates the date on which the section has been stained. The field can be left blank if a section has not yet been stained.

#### Project

The Project field is linked to the <u>Projects</u> list and is used to assign the section to a specific project. Each section is linked to a single project only.

#### Resources

💙 ΙΟΝΡΑΤ	<sup>-н</sup> Project D	oata Re	esources
Panels	Conjugates	Tissues	Instruments

The Resources menu contains links to the Conjugates, Panels, Tissues, and Instruments pages.

#### **Conjugates Page**

The Conjugates page lists all conjugates available for creating staining panels.

Panels	Conjugates Tissues Instrumen	ts								
+ New +						s	Search			
ID (Lot)	Target	Clone	Mass	Element	Stock	Recommended C	Con	Manufactured	Expires	Unit Type
001	PAX5	D7H5X	153	Eu	500 µg/mL			2017-01-19	2017-10-20	µg/mL
001	Pan-Actin	D18C11	174	Yb	500 µg/mL			2017-02-24	2018-02-16	µg/mL
001	Ki-67	SP6	151	Eu	500 µg/mL			2017-02-24	2018-02-16	µg/mL
001	FOXP3	236A/E7	141	Pr	500 µg/mL			2017-02-24	2018-02-16	µg/mL
001	Keratin	AE1/AE3	165	Но	500 µg/mL			2017-01-19	2018-01-09	µg/mL
001	CD45	2B11 & PD7/26	175	Lu	500 µg/mL			2017-01-19	2018-01-09	µg/mL
001	CD3	D7A6E	159	Tb	500 µg/mL			2017-01-19	2017-11-16	µg/mL
10 -									<< < 97 5	38 99 100 101

The conjugates list is either a simple table listing manual entries or a read-only table, populated from an external database, depending on the application's configuration. MIBItracker can be linked to many popular lab databases such as Odoo or Knack.

The conjugates list contains the following columns and can be sorted on any of them by clicking on the column header. Click on a row to display, edit, or download information specific to a single section.

#### ID (Lot)

The ID (Lot) field is used to track the lot number of the conjugates, either assigned by the vendor or an in-house tracking of successive conjugations.

#### Target

The Target field is used to track the biomolecule to which the conjugated antibody binds.

#### Clone

The Clone field is used to track the clone of monoclonal antibodies.

#### Mass

The Mass field is used to track the atomic mass of the metal isotope conjugated to the antibody.

#### Element

The Element field is used to track the metal element conjugated to the antibody.

#### Stock µg/mL

The Stock  $\mu$ g/mL field is used to track the concentration in micrograms per milliliter of the conjugate stock solution.

#### Rec. µg/mL

The Rec.  $\mu$ g/mL field is used to track the manufacturer or user recommended concentration in micrograms per milliliter of the conjugate in the staining solution.

#### Manufactured

The Manufactured field is used to track the manufacture/conjugation date of the conjugate.

#### **Expires**

The Expires field is used to track the expiration date of a conjugate reagent.

#### **Panels Page**

The Panels page lists all conjugates panels used to stain slides. The conjugates listed in a panel define which channels are available to overlay in a FOV.

Pa	anels C	Conjugates Tissues Instru	iments						
Panels Drafts Compare									
			s		Reset				
	Panel ID	Name	Description		Manufactured On				
0	800	201216_HuFFPE_Tumor 3			2020-12-16				
0	799	201216_HuFFPE_Tumor 2			2020-12-16				
0	798	201216_HuFFPE_Tumor 1			2020-12-16				
0	797	201216_HuFFPE_Normal 4			2020-12-16				

The panels list contains the columns listed below and can be sorted by any of them by clicking on the column header. Click on a row to display, edit, or assign the panel to sections. You can also download the panel in CSV format for use in the MIBI-TIFF Generator or other databases and applications.

#### Panel

The Panel field is an identification number automatically generated by the database when the panel is created.

#### Name

The panel Name field is a custom label for the panel entered by the user when the panel is created.

#### Description

The optional Description field is used to hold additional information about the panel.

#### Manufactured On

The Manufactured On column is a required field used to record the date on which the panel was created.

#### Project

The Project field is linked to the Projects list and is used to assign the panel to a specific project. Each panel is linked to a single project only.

#### **Tissues Page**

The Tissues page lists all tissue types that can be assigned to sections. The tissues list contains the following columns and can be sorted on any of them by clicking on the column header. Click on a row to display, edit, or download information specific to a single section.

#### Organ

The Organ field is used to track the organ from which a tissue sample is extracted.

#### Subsite

The Subsite field is used to more specifically describe the location from which a tissue sample has been extracted.

#### Diagnosis/Classification

The Diagnosis/Classification field is used to describe the pathology of the tissue sample.

#### Instruments Page

The Instruments page lists MIBIscope instruments which can be assigned to each slide, section, or image to denote the specific instrument or instrument version used for acquisition of a given data set.

The instruments list contains a single column and can be sorted by clicking on the column header.

#### Name

The Name field is the label given to a specific instrument by the user.