

BioNumerics Tutorial:

Configuring the database layout

1 Aim

The BioNumerics user interface is very flexible and can be customized to a high degree by the user, for example by hiding information fields, panels and toolbars which are not needed in the context of an analysis, or by only displaying database items based on user-defined settings using *views* (e.g. only displaying my own experiment types, only displaying database entries that were added to the database in the last 30 days, ...). In this tutorial you will learn how to change the appearance of the information displayed in grid panels, how to move, hide and enable panels and toolbars and how to use views.

2 Preparing the database

The **DemoBase Connected** will be used in this tutorial and can be downloaded directly from the *BioNumerics Startup* window or restored from the back-up file available on our website:

1. To download the database directly from the *BioNumerics Startup* window, click the **Download example databases** link, located in the lower right corner of the *BioNumerics Startup* window. Select **DemoBase Connected** from the list and select **Database > Download**. Confirm the download action.
2. To restore the database from the back-up file, first download the file `DemoBase_Connected.bnbk` from <http://www.applied-maths.com/download/sample-data>, under 'DemoBase Connected'.

In the *BioNumerics Startup* window, press the  button, select **Restore database**, browse for the downloaded file and select **Create copy**. Specify a name and click **<OK>**.



In contrast to other browsers, some versions of Internet Explorer rename the `DemoBase_Connected.bnbk` database backup file into `DemoBase_Connected.zip`. If this happens, you should manually remove the `.zip` file extension and replace with `.bnbk`. A warning will appear ("If you change a file name extension, the file might become unusable."), but you can safely confirm this action. Keep in mind that Windows might not display the `.zip` file extension if the option "Hide extensions for known file types" is checked in your Windows folder options.

3 Display options in grid panels

3.1 Grid panels

1. In the *BioNumerics Startup* window, double-click on the **DemoBase Connected** database to open it.

In a BioNumerics database, all major data classes can be seen as database *items*. Examples of such items are database entries, fingerprint files, comparisons, etc... Lists of BioNumerics database items are displayed in grid panels. Each grid panel consists of information fields organized in columns and database items of a certain type in rows.

2. Click somewhere in the *Experiment types* panel to make it the active panel.

One of the rows in the *Experiment types* panel is highlighted in orange, indicating the active state of the panel (see Figure 1).

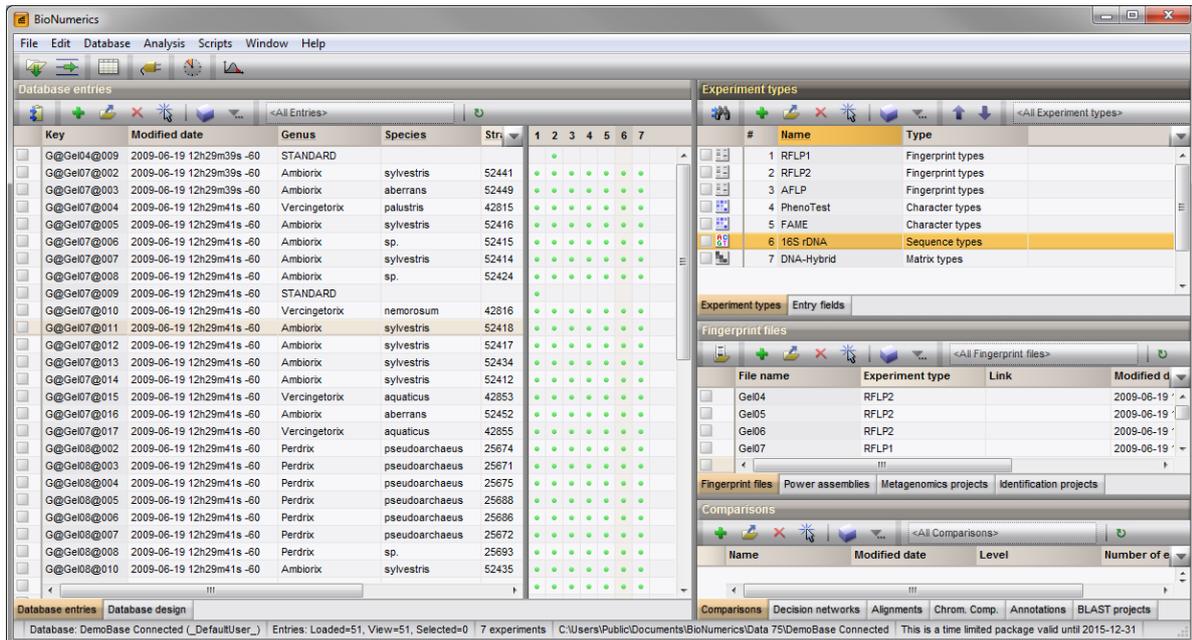


Figure 1: The *Main* window with the active *Experiment types* panel.

3. Select **Edit** in the menu of *Main* window.

All commands listed under the **Edit** menu apply to the active panel, which is the *Experiment types* panel in this example (see Figure 2).

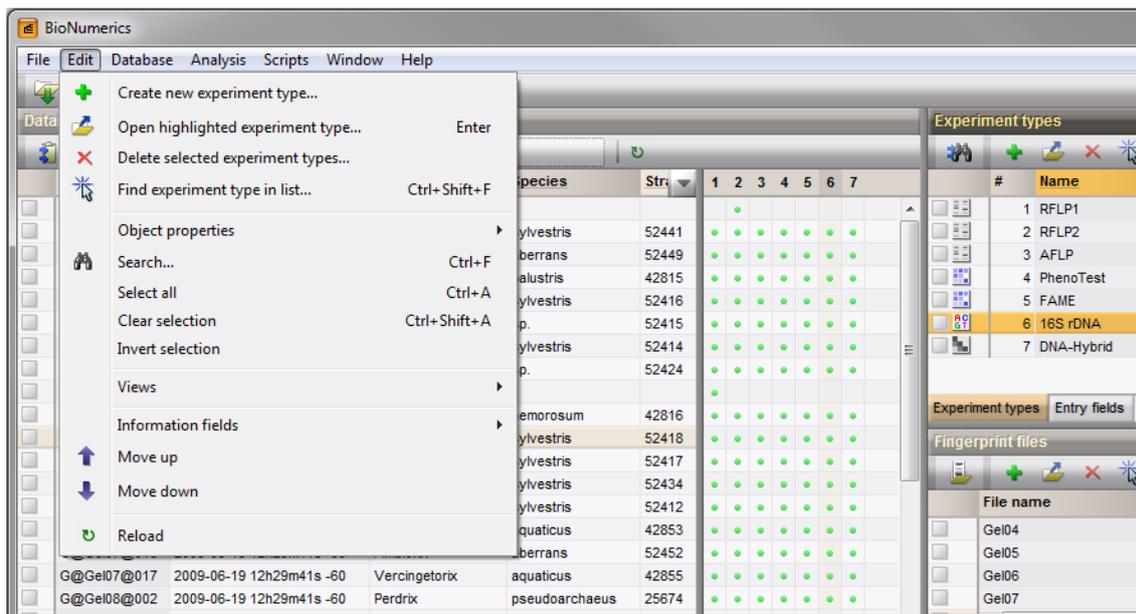


Figure 2: Edit commands applicable to the *Experiment types* panel.

3.2 Column display options

4. Click somewhere in the *Fingerprint files* panel to make it the active panel.

5. Move the separator line in the column heading left or right to change the width of a column.
6. Select *Edit* > *Information fields* > *Add information field...* or right-click in the information fields header of the *Fingerprint files* panel and select *Add information field*.
7. Specify a name (e.g. **Restriction enzyme**) and press <OK> to add the new column to the *Fingerprint files* panel.

Column properties can be accessed via the column properties button , located on the right hand side in the information fields header (see Figure 3 for an example).

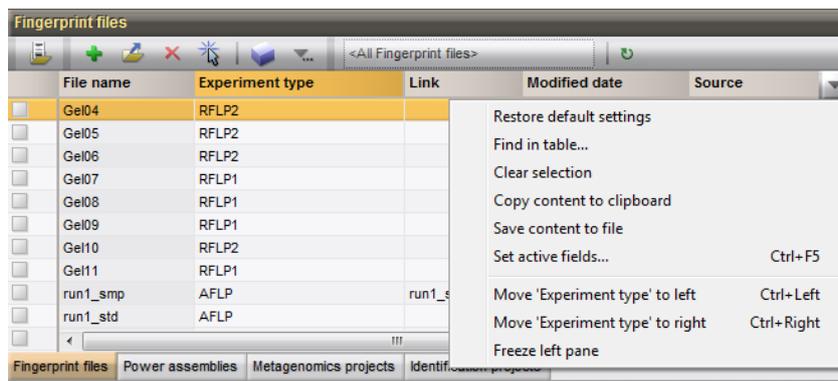


Figure 3: Column properties of the *Fingerprint files* panel.

8. Click on the column properties button  in the header of the *Fingerprint files* panel and select *Set active fields* (see Figure 3).

This pops up the *Set active fields* dialog box as shown in Figure 4. The *Set active fields* dialog box lists all information fields defined for the *Fingerprint files* panel in the database. The fields for display can be enabled and disabled with the check boxes next to the field names.

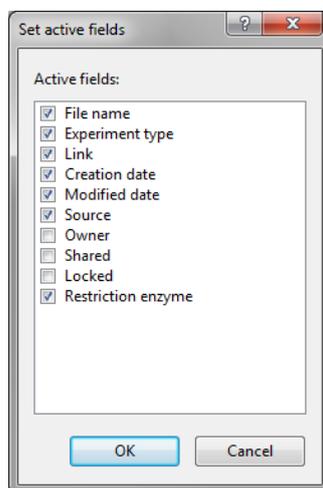


Figure 4: The *Set active fields* dialog box: checked fields will be displayed in the corresponding grid panel.

9. Check the field *Creation date* (if not already checked) and press <OK> to update the display of the fields.

The relative position of a selected column within a panel can be changed as follows:

10. Click on a column in the *Fingerprint files* panel, click on the column properties button  and use the menu items *Move 'column name' to left* and *Move 'column name' to right* to change the position of the selected column. Alternatively use the shortcut keys **Ctrl+left arrow** and **Ctrl+right arrow**.

11. To revert to the default column properties settings for the active panel, click on the column properties button  and select **Restore default settings**.

This action will disable all introduced changes to the column properties of the grid panel.

12. Click somewhere in the *Database entries* panel to make it the active panel.

13. Click on the column properties button  in the header of the *Database entries* panel and select **Set active fields**.

The dialog that pops up lists all default entry fields. The fields for display can be enabled and disabled with the check boxes next to the field names (see Figure 5).

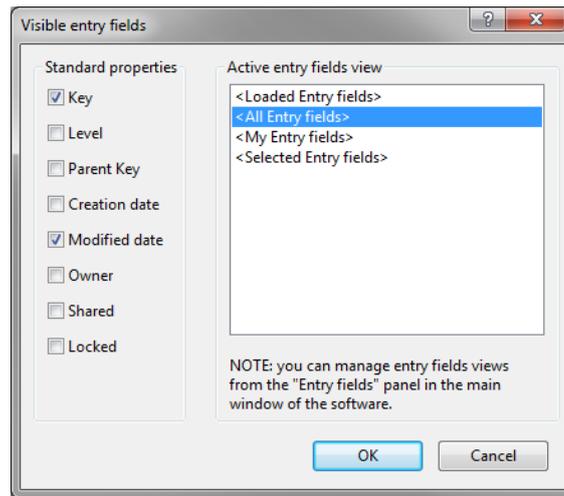


Figure 5: Default entry fields.

14. Close the dialog and click on the *Entry fields* tab located in the upper right corner of the *Main* window to make it the active panel.

All non-default entry fields defined in the database are displayed in the *Entry fields* panel (see Figure 7).

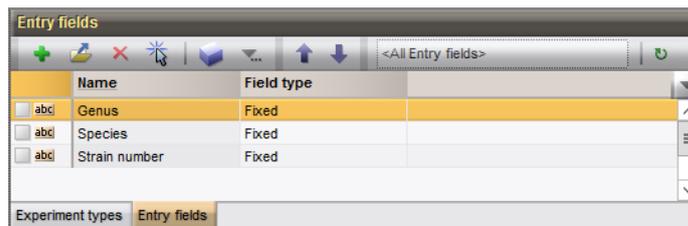


Figure 6: Non-default entry fields.

15. Select the *Genus* and *Species* fields.

To select an item in the list, simply click on the check box with the mouse, or **Ctrl+click** the item. To select a range of items, click on the first item in the list and – whilst holding the **Shift**-key on the keyboard – clicking on the last item to be selected.

16. Click on **<All Entry fields>** in the toolbar of the *Entry fields* panel and select **<Selected Entry fields>** from the drop-down list.

The *Database entries* panel is updated.

17. To show all entry fields again in the *Database entries* panel, click on the drop-down list in the toolbar of the *Entry fields* panel and select **<All Entry fields>**.

3.3 Row display options

18. Click on the *Type* column header in the *Experiment types* panel to make it the active column.

The rows in the grid can be sorted based on the content of the highlighted column in several ways:

- *Edit* > *Information fields* > *Sort by field* arranges information alphabetically (a to z).
- *Edit* > *Information fields* > *Sort by field (reverse)* sorts information in reverse alphabetical order (z to a).
- *Edit* > *Information fields* > *Sort by field (Numerical)* sorts numerical information in ascending order.
- *Edit* > *Information fields* > *Sort by field (Numerical, reverse)* sorts numerical information in descending order.

19. Select *Edit* > *Information fields* > *Sort by field* or right-click on the column name *Type* and select *Sort by field* to arrange the information alphabetically.

20. A selected row can be moved up or down the list using the *Edit* > *Move up* (↑) and *Edit* > *Move down* (↓) options.

All information available in the database is standard displayed in each grid panel: the *view* in the toolbar of each panel is default set to <All ...> (see Figure 7 for an example). One can easily switch to another *view* via the drop-down list.

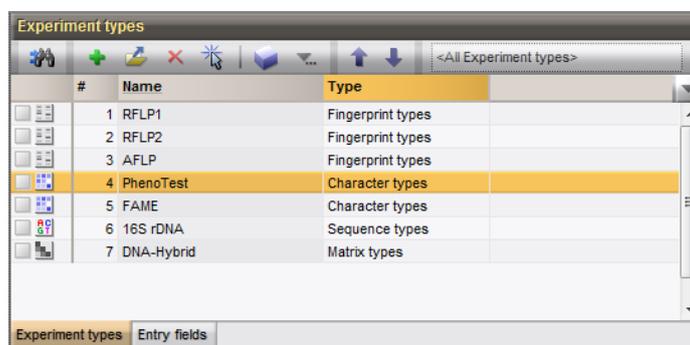


Figure 7: The *Experiment types* panel: all experiment types are default displayed.

21. Click on the drop-down list in the toolbar of the *Experiment types* panel (see Figure 8).

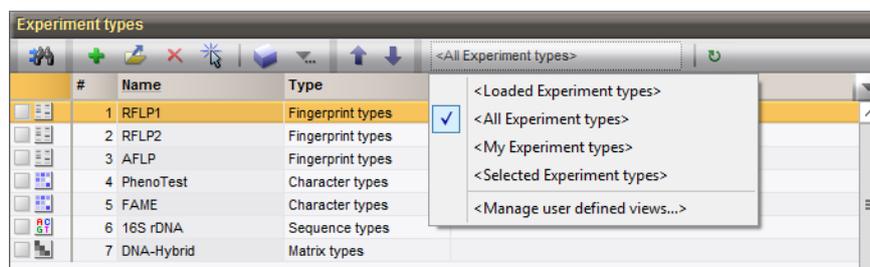


Figure 8: An example of a *view* drop-down list, here from the *Experiment types* panel.

Four predefined *views* are available in each grid panel: <Loaded ...> (all database items loaded into memory), <All ...> (all database items available in the database), <My ...> (all database items of which the

logged-in user is the owner), <**Selected ...**> (all currently selected database items). To illustrate these options, we will first create a selection in the *Experiment types* panel.

22. Select the two **RFLP** fingerprint type experiments in the *Experiment types* panel (see Figure 9).

To select an item in the list, simply click on the check box with the mouse, or **Ctrl+click** the item. To select a range of items, click on the first item in the list and – whilst holding the **Shift**-key on the keyboard – clicking on the last item to be selected.

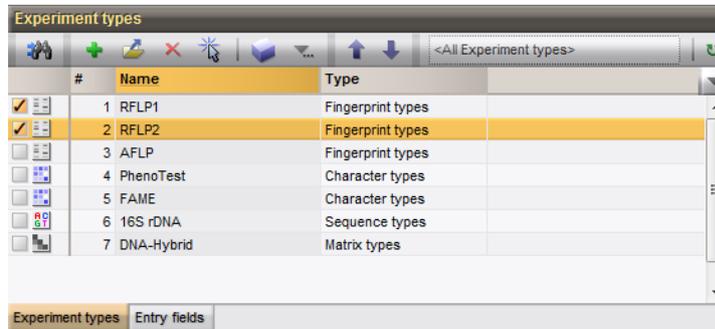


Figure 9: Two selected experiments.

23. Click on the drop-down list in the toolbar of the *Experiment types* panel and choose the <**Selected Experiment types**> option (see Figure 8).

The experiment list in the *Experiment types* panel and *Experiment presence* panel is updated.

24. Switch back to the previous view by clicking on the drop-down list in the toolbar of the *Experiment types* panel and choose the <**All Experiment types**> option.

Besides the four predefined views, it is also possible to create and save your own custom *views* based on a *selection* or based on *query*.

25. Make sure the two RFLP experiments are still selected in the *Experiment types* panel, click on the drop-down list in the toolbar of the *Experiment types* panel and choose <**Manage user defined views...**> to call the *Manage user views* dialog box.
26. Click the <**Add**> button to call the *New object view* dialog box (see Figure 10).

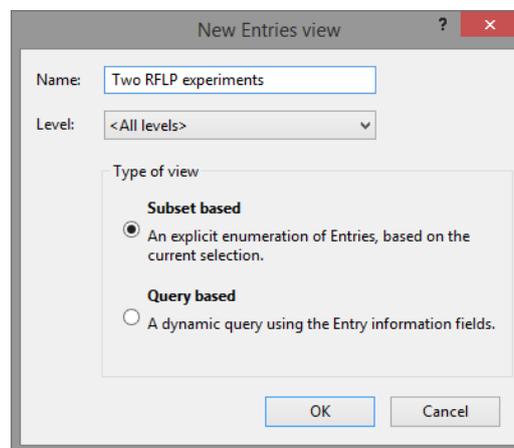


Figure 10: A selection based view.

27. Specify a name (e.g. **Two RFLP experiments**), make sure the **Subset based** option is selected and press <**OK**> and <**Exit**>.

The new view is added to the drop-down list in the *Experiment types* panel and is automatically selected (see Figure 11).

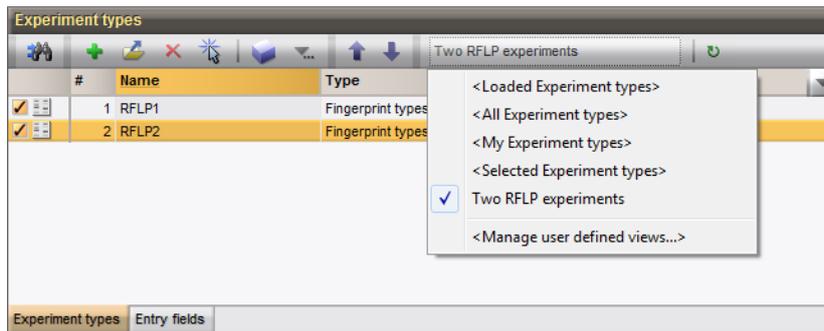


Figure 11: A new selection-based view added to the list.

A *selection* based view is a *static* view: when new items are added to the database they will never automatically be part of the view, unless they are explicitly assigned to the view after creation (this can be done with the *<Edit>* button in the *Manage user views* dialog box).

A *query* based view is a *dynamical* view: when new database items are added to the database that fulfill the criteria present in the query, they will be returned by the view. As an example we will create a query based view that will return all **Perdrix** entries in the *Database entries* panel.

28. Click on the drop-down list in the toolbar of the *Database entries* panel and choose *<Manage user defined views...>* to call the *Manage user views* dialog box.
29. Click the *<Add>* button to call the *New object view* dialog box (see Figure 12).

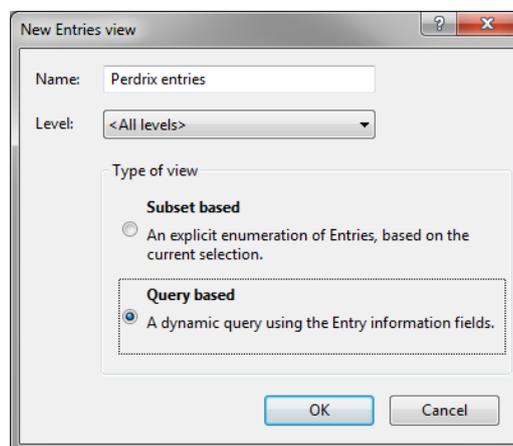


Figure 12: A query based view.

30. Specify a name (e.g. **Perdrix entries**), make sure the *Query based* option is selected and press *<OK>*.
31. Type **Perdrix** next to **Genus** and select *Equals* from the list (see Figure 13).
32. Press *<OK>*, *<Yes>* and *<Exit>*.

The new view is added to the drop-down list in the *Database entries* panel and is automatically selected (see Figure 14). When new entries are added to the database having the text **Perdrix** in the **Genus** field, they will automatically be included in the view.

Figure 13: Query criterion.

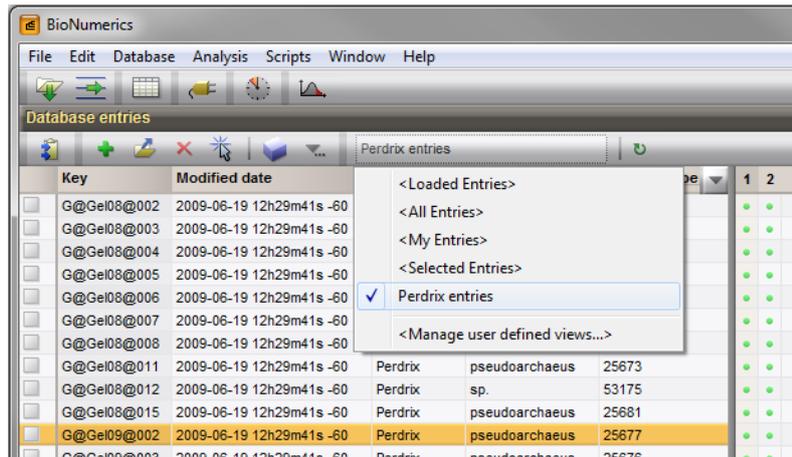


Figure 14: A new query-based view added to the list.

As a second example we will create a query based view that will return all entries in the *Database entries* panel that were added to the database in the last 30 days.

33. Click on the drop-down list in the toolbar of the *Database entries* panel and choose *<Manage user defined views...>* to call the *Manage user views* dialog box again.
34. Click the *<Add>* button to call the *New object view* dialog box.
35. Specify a name (e.g. **Added last 30 days**), make sure the *Query based* option is selected and press *<OK>* (see Figure 15).

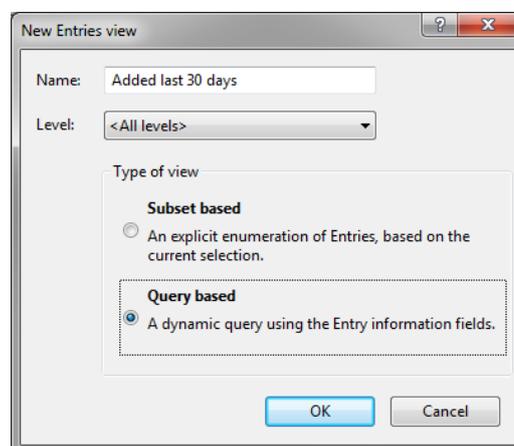


Figure 15: A query based view.

36. Select **<Add new>** to add a new item to the list.
37. Click on the **?** item and select **Creation date**. Select **[CurrentDate]-14** from the list next to **Creation date**, and change **-14** to **-30**. Select **Larger than** from the list (see Figure 16) and press **<OK>**, **<Yes>** and **<Exit>**.



Figure 16: Query criterion.

The new view is added to the drop-down list in the *Database entries* panel and is automatically selected. All entries added to the database in the last 30 days are automatically included in the view.

38. To add a new entry to the database, click on the *Database entries* panel to highlight this panel in the *Main* window, select **Edit > Create new object...** () and press **<OK>**.

The new entry is added to the database and is automatically added to the **Added last 30 days** view.

39. Click on the drop-down list in the toolbar of the *Database entries* panel and choose **<All Entries>** to display all entries again.
40. Click on the drop-down list in the toolbar of the *Fingerprint files* panel and choose **<Manage user defined views...>** to call the *Manage user views* dialog box (see Figure 17).

The option **Load complete set at start of a session** in the *Manage user views* dialog box can be very useful in case of large databases. When this option is unchecked, only those database items (here: fingerprint files) that are retrieved by the selected **Startup view** are loaded in computer memory. When the **<Loaded Fingerprint files>** view is selected as **Startup view**, no fingerprint files will be loaded when opening the database. This will significantly reduce the startup time of databases having a lot of fingerprint files.

41. Select the **<Loaded Fingerprint files>** view as **Startup view** in the *Manage user views* dialog box and uncheck **Load complete set at start of session**. Press **<Exit>**.
42. Close and reopen the database.

The **<Loaded Fingerprint files>** view is now the default view in the *Fingerprint files* panel. If you want to see a fingerprint file associated with an entry, it will be dynamically fetched when clicking on a green dot in the *Experiment presence* panel. Alternatively, open the *Entry* window (double-click on the entry), and click on the link (purple arrow).

4 Moving grid panels

The *Main* window in default configuration consists of a menu, a toolbar for quick access to the most important functions, a status bar, and several panels. If for example you are only interested in the analysis of sequences the *Fingerprint files* panel is not needed at all in this context and can therefore be removed from the display:

1. Right-click on the header of the *Fingerprint files* panel and select **Close Fingerprint files**.

The *Fingerprint files* panel is now hidden. If the panel needs to be displayed again, proceed as follows:

2. Select **Window > Show / hide panels** in the *Main* window.

This displays a sub-menu, listing all available panels. Panel names for which a check mark is present left of the menu item are shown in the window.

3. Click on **Fingerprint files** in the sub-menu. The *Fingerprint files* panel is now displayed again.

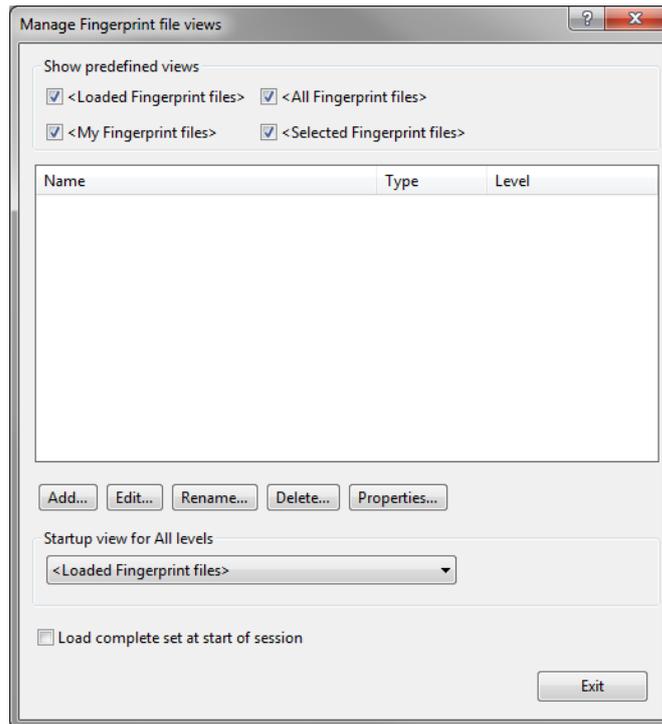


Figure 17: Load fingerprint file information dynamically.

Furthermore, dockable panels can be placed on the screen in one of two modes: floating or docked. **Floating** allows the window to be placed anywhere on the screen, the **docked** mode automatically places the panel in one of five locations: top, bottom, left, right, or stacked onto another panel (tabbed view). The position of a panel is controlled with a **docking guide** (see Figure 18).

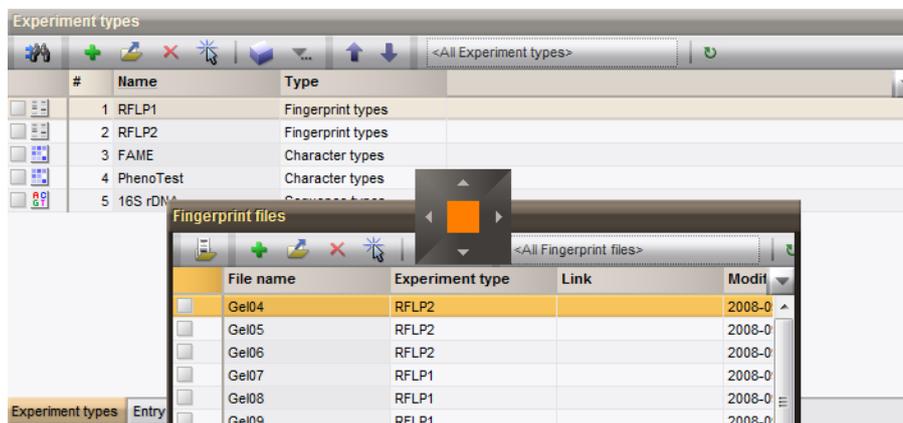


Figure 18: Docking the *Fingerprint files* panel as a tabbed view.

- Click in the header of the *Fingerprint files* panel and - while keeping the mouse button pressed - drag it towards the *Experiment types* panel. As soon as the panel leaves its original position, a docking guide appears in the center of the *Experiment types* panel. Release the mouse button on any place next to the docking guide to leave the panel floating in the window.

A floating window can be repositioned to any place on your monitor.

- Click in the *Fingerprint files* panel header and drag it towards the *Experiment types* panel again. Drop the *Fingerprint files* panel on the center of the docking guide (see Figure 18).

As a result, the *Fingerprint files* panel is now displayed as a tabbed view with the *Experiment types* panel

and *Entry fields* panel (see Figure 19).

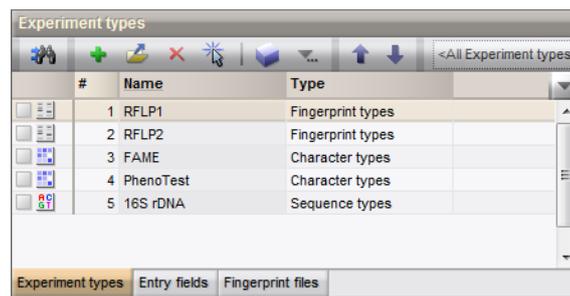


Figure 19: Result of the action depicted in Figure 18: tabbed view of the *Experiment types* panel, *Entry fields* panel and *Fingerprint files* panel.

The position of a toolbar within a window or panel can be altered as follows:

6. In the header of the *Main* window, click on the dark gray area in a toolbar, left of a set of buttons. The mouse pointer will take the shape of a hand on top of two arrows. Drag the toolbar left or right to change the order in which the toolbars appear.
7. In the header of the *Main* window, drag another toolbar slightly downwards to make the toolbars appear in two rows.
8. Click on a toolbar again and drag it to the left (or right or bottom) part of the window to dock it on the left (or right or bottom) part of the window.

After making some changes to the window configuration (panels as well as toolbars), it is always possible to return to the default configuration for the active window. If you intend to revert to the user-defined configuration afterwards, then you can save the user-defined configuration first and recall it afterwards.

9. Select **Window > Save current configuration** to store the configuration that you have just defined.
10. To restore the default configuration, select **Window > Restore default configuration**. The window now appears back in its original configuration.
11. Recall the user-defined configuration with **Window > Recall saved configuration**. Notice that the changes you made to the window configuration are introduced again.
12. Any window configuration can be protected from accidental changes via **Window > Lock configuration**.
13. Configuration changes will be enabled if **Window > Lock configuration** is selected again.

5 Conclusion

Customizing the database layout of your BioNumerics database as described in the sections above will help you in accessing your data and analyses in BioNumerics in the most efficient way.