

# GenEx

Software library for object detection in genetical analysis evaluation

Softwarová knihovna pro vyhledávání objektů při vyhodnocování genetických analýz

## Application Programming Interface

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# Chapter 1

## Namespace Index

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# Class Index

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---



## Chapter 5

# Namespace Documentation

### 5.1 Package genex

#### Packages

- package [lib](#)

#### Classes

- class [DapiProcessor](#)
- class [GenexIterator](#)
- class [GenexPipeline](#)
- class [SignalProcessor](#)

#### 5.1.1 Detailed Description

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## 5.2 Package genex.lib

### Packages

- package [filter](#)
- package [i18n](#)
- package [imagereader](#)
- package [output](#)
- package [params](#)
- package [threshold](#)

### Classes

- class [Channel](#)  
*Single channel representation.*
- class [ChannelStringMap](#)
- class [Dapi](#)
- class [ExtRoi](#)
- class [GenExDefines](#)
- class [GraphicsUtils](#)
- class [ObjectFilter](#)
- class [RoiLabeler](#)
- class [Segmenation](#)
- class [SigChannel](#)  
*Channel-specific methods for hybridization signals, extends the [Channel](#) class.*
- class [SignalRoi](#)
- class [SignalStats](#)
- class [Util](#)

### 5.2.1 Detailed Description

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## 5.3 Package genex.lib.filter

### Classes

- interface [AbstractFilterFactory](#)
- class [AreaCircFilter](#)
- class [AreaCircFilterFactory](#)
- interface [Filter](#)

## 5.4 Package genex.lib.i18n

### Classes

- class [GenExBundle](#)
- class [GenExBundle\\_cs\\_CZ](#)
- class [GenExBundle\\_en\\_US](#)

## 5.5 Package genex.lib.imagereader

### Classes

- class [FileImgReader](#)
- interface [ImageReader](#)
- class [RGBUtils](#)
- class [ScreenImgReader](#)

## 5.6 Package genex.lib.output

### Classes

- class [FISHdata](#)
- class [Results](#)

### 5.6.1 Detailed Description

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## 5.7 Package `genex.lib.params`

### Classes

- class [ChannelInfo](#)
- class [ImageDirInfo](#)
- class [InputGuiMain](#)
- class [InputGuiUtils](#)
- class [ParamDefines](#)

### 5.7.1 Detailed Description

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## 5.8 Package `genex.lib.threshold`

### Classes

- interface [AbstractThresholdFactory](#)
  - class [CSVWriter](#)
-

- class [IJAutoThreshold](#)
- class [IJAutoThresholdFactory](#)
- class [SnellThreshold](#)

*Implementation of Violet Snell segmentation.*

- class [SnellThresholdFactory](#)
  - interface [Threshold](#)
-

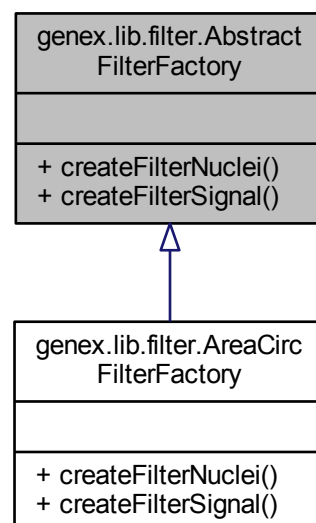


## Chapter 6

# Class Documentation

### 6.1 genex.lib.filter.AbstractFilterFactory Interface Reference

Inheritance diagram for genex.lib.filter.AbstractFilterFactory:



Collaboration diagram for `genex.lib.filter.AbstractFilterFactory`:



## Public Member Functions

- [Filter createFilterNuclei \(\)](#)
- [Filter createFilterSignal \(\)](#)

### 6.1.1 Member Function Documentation

#### 6.1.1.1 Filter `genex.lib.filter.AbstractFilterFactory.createFilterNuclei ( )`

Implemented in [genex.lib.filter.AreaCircFilterFactory](#).

#### 6.1.1.2 Filter `genex.lib.filter.AbstractFilterFactory.createFilterSignal ( )`

Implemented in [genex.lib.filter.AreaCircFilterFactory](#).

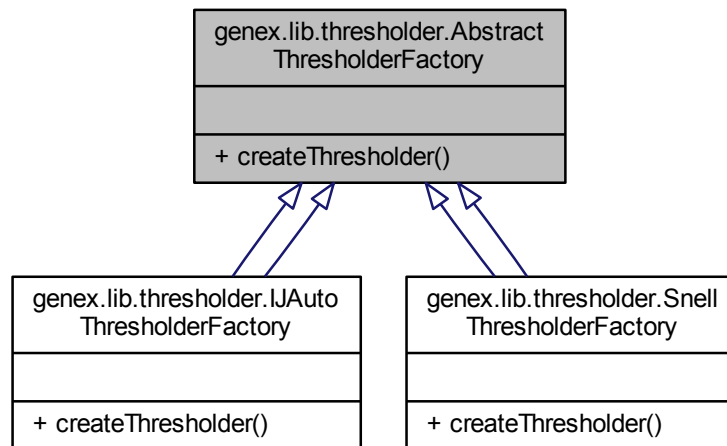
The documentation for this interface was generated from the following file:

- `src/genex/lib/filter/AbstractFilterFactory.java`
-

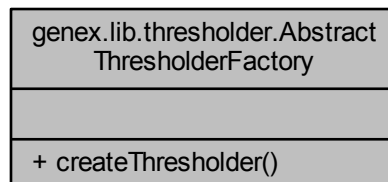


## 6.2 genex.lib.threshold.AbstractThresholderFactory Interface Reference

Inheritance diagram for genex.lib.threshold.AbstractThresholderFactory:



Collaboration diagram for genex.lib.threshold.AbstractThresholderFactory:



### Public Member Functions

- [Thresholder createThreshold \(\)](#)

#### 6.2.1 Detailed Description

Abstract factory for the thresholder methods.

Author

J. Schier

---

## 6.2.2 Member Function Documentation

### 6.2.2.1 Thresholder `genex.lib.threshold.AbstractThresholdFactory.createThreshold ( )`

Create threshold instance

Returns

[Thresholder](#)

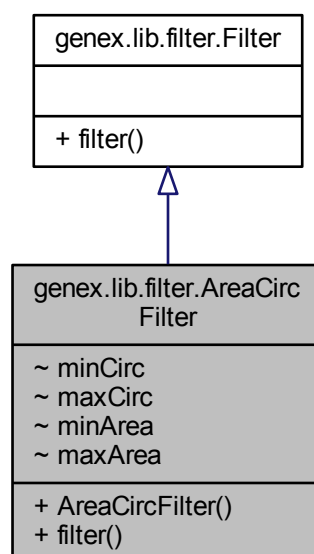
Implemented in [genex.lib.threshold.IJAutoThresholdFactory](#), and [genex.lib.threshold.SnellThresholdFactory](#).

The documentation for this interface was generated from the following file:

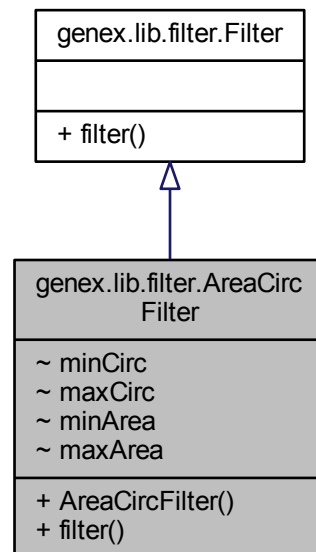
- `src/genex/lib/threshold/AbstractThresholdFactory.java`

## 6.3 `genex.lib.filter.AreaCircFilter` Class Reference

Inheritance diagram for `genex.lib.filter.AreaCircFilter`:



Collaboration diagram for genex.lib.filter.AreaCircFilter:



## Public Member Functions

- `AreaCircFilter` (int `minArea`, int `maxArea`, double `minCirc`, double `maxCirc`)
- void `filter` (ArrayList< `ExtRoi` > `rois`, ResultsTable `results`)

## Package Attributes

- final double `minCirc`
- final double `maxCirc`
- final int `minArea`
- final int `maxArea`

### 6.3.1 Constructor & Destructor Documentation

6.3.1.1 `genex.lib.filter.AreaCircFilter.AreaCircFilter ( int minArea, int maxArea, double minCirc, double maxCirc )`

### 6.3.2 Member Function Documentation

6.3.2.1 void `genex.lib.filter.AreaCircFilter.filter ( ArrayList< ExtRoi > rois, ResultsTable results )`

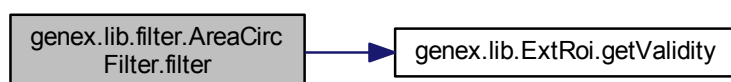
`Filter` list of `ExtRoi` by area and circularity, as set by class constructor. The result (boolean valid{invalid}) is, for each particle, stored into the corresponding `ExtRoi` parameter and to the the results table, column "Valid", in the row with label corresponding with the roi name. `ExtRoi` class is used.

## Parameters

<i>results</i>	results table
<i>extRoi</i>	input roi (see ( <a href="#">ExtRoi</a> ))

Implements [genex.lib.filter.Filter](#).

Here is the call graph for this function:



### 6.3.3 Member Data Documentation

6.3.3.1 `final int genex.lib.filter.AreaCircFilter.maxArea` [package]

6.3.3.2 `final double genex.lib.filter.AreaCircFilter.maxCirc` [package]

6.3.3.3 `final int genex.lib.filter.AreaCircFilter.minArea` [package]

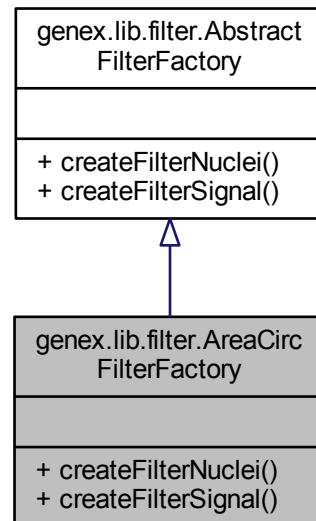
6.3.3.4 `final double genex.lib.filter.AreaCircFilter.minCirc` [package]

The documentation for this class was generated from the following file:

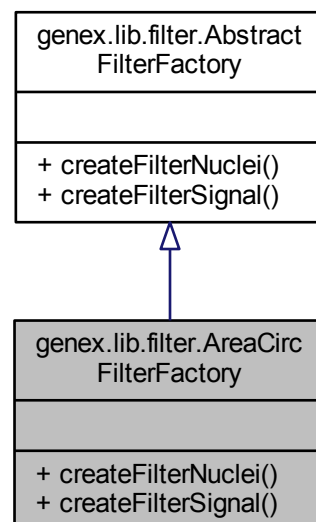
- `src/genex/lib/filter/AreaCircFilter.java`

## 6.4 genex.lib.filter.AreaCircFilterFactory Class Reference

Inheritance diagram for genex.lib.filter.AreaCircFilterFactory:



Collaboration diagram for genex.lib.filter.AreaCircFilterFactory:



## Public Member Functions

- [Filter createFilterNuclei \(\)](#)
- [Filter createFilterSignal \(\)](#)

### 6.4.1 Member Function Documentation

#### 6.4.1.1 Filter [genex.lib.filter.AreaCircFilterFactory.createFilterNuclei \( \)](#)

Implements [genex.lib.filter.AbstractFilterFactory](#).

#### 6.4.1.2 Filter [genex.lib.filter.AreaCircFilterFactory.createFilterSignal \( \)](#)

Implements [genex.lib.filter.AbstractFilterFactory](#).

The documentation for this class was generated from the following file:

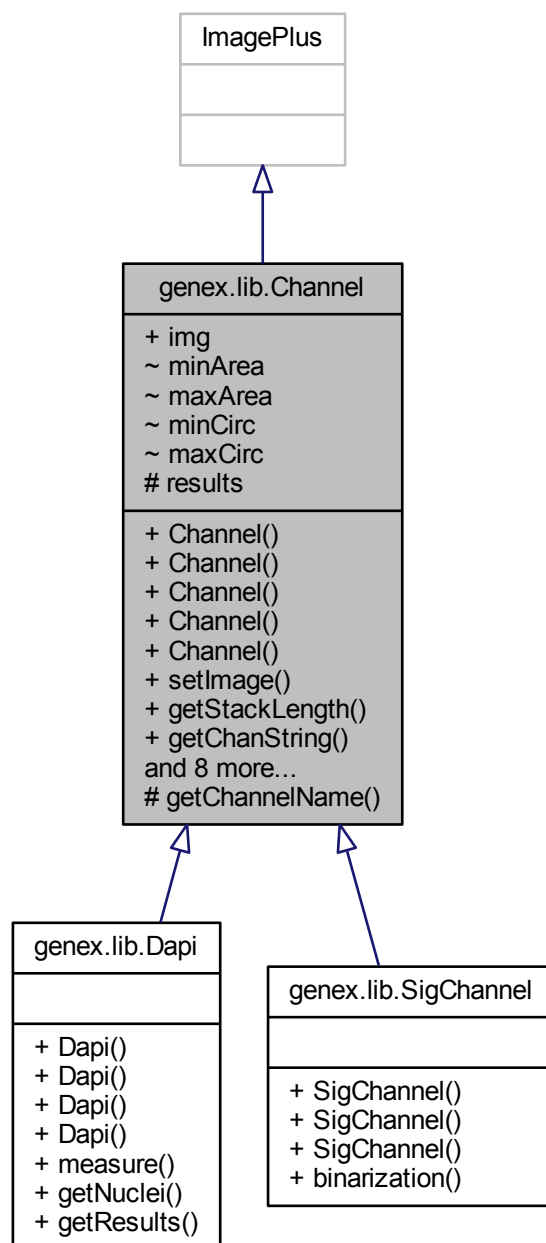
- [src/genex/lib/filter/AreaCircFilterFactory.java](#)

## 6.5 [genex.lib.Channel](#) Class Reference

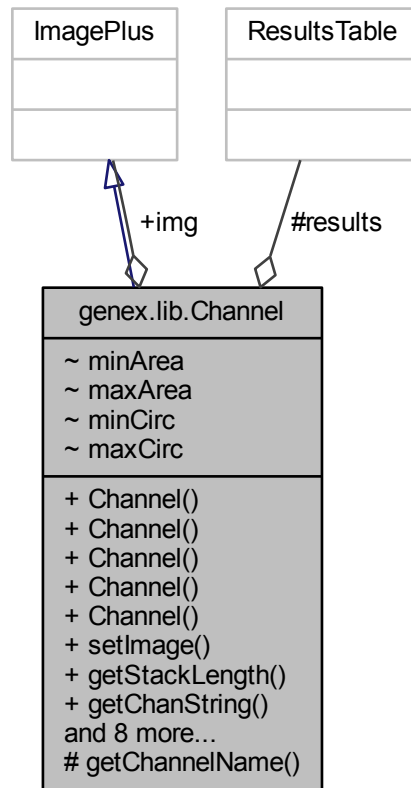
Single channel representation.

---

Inheritance diagram for genex.lib.Channel:



Collaboration diagram for `genex.lib.Channel`:



## Public Member Functions

- [Channel](#) (`ImageStack[]` stack, `String` channelName)
- [Channel](#) (`ImageStack[]` stack, `GenExDefines.ChannelNames` channel)
- [Channel](#) (`ImagePlus` image, `String` name)
- [Channel](#) (`String` name)
- [Channel](#) (`ImagePlus` img, [ChannelNames](#) channel)
- void [setImage](#) (final `ImagePlus` img)
- int [getStackLength](#) ()
- `String` [getChanString](#) ([ChannelNames](#) channel)
- `String` [getChanString](#) ()
- `ImagePlus` [denoise](#) (final [Filters](#) filtGaussian)
- void [normalizeIntensity](#) (final int maxIntensity)
- void [preprocessing](#) (final [Filters](#) filtMedian, final boolean despeckle, final int radiusBackground)
- void [showBinary](#) ()
- `ArrayList< ExtRoi >` [analyzeParticles](#) (final int measurements, final int [minArea](#), final int [maxArea](#), final double [minCirc](#), final double [maxCirc](#))
- `ImagePlus` [getBinImg](#) ()
- void [setBinImg](#) (`ImagePlus` binImg)



## Public Attributes

- ImagePlus [img](#)

## Protected Member Functions

- [ChannelNames](#) [getChannelName](#) ()

## Protected Attributes

- ResultsTable [results](#) = new ResultsTable()

## Package Attributes

- int [minArea](#)
- int [maxArea](#)
- double [minCirc](#)
- double [maxCirc](#)

### 6.5.1 Detailed Description

Single channel representation.

methods for selection of a channel from the input RGB image. preprocessing methods, background correction

### 6.5.2 Constructor & Destructor Documentation

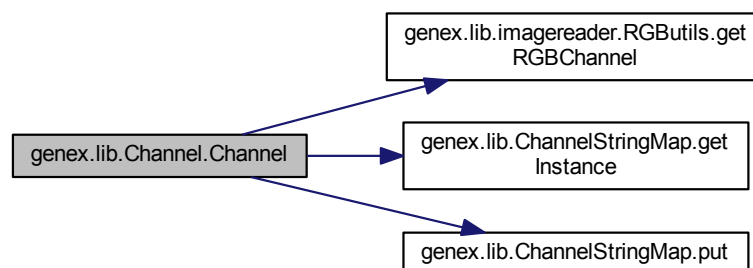
#### 6.5.2.1 `genex.lib.Channel.Channel ( ImageStack[] stack, String channelName )`

Selects channel from the input RGB stack.

##### Parameters

<i>stack</i>	input stack of RGB images (from microscope)
<i>channelName</i>	"RED"/"GREEN"/"BLUE" color of the selected channel

Here is the call graph for this function:



6.5.2.2 `genex.lib.Channel.Channel ( ImageStack[] stack, GenExDefines.ChannelNames channel )`

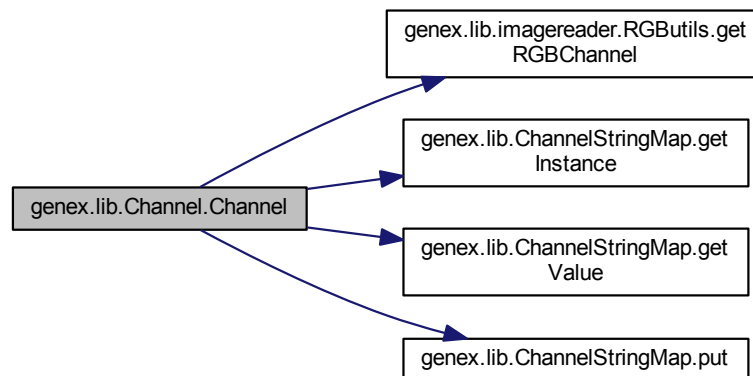
Selects channel from the input RGB stack.

---

## Parameters

<i>stack</i>	input stack of RGB images (from microscope)
<i>channel</i>	RED/GREEN/DAPI selected channel <a href="#">GenExDefines.ChannelNames</a>

Here is the call graph for this function:

6.5.2.3 `genex.lib.Channel.Channel ( ImagePlus image, String name )`

Constructs the [Channel](#) object from a single input image.

## Parameters

<i>image</i>	input image
<i>name</i>	channel name

6.5.2.4 `genex.lib.Channel.Channel ( String name )`

Assign name to the [Channel](#) object

## Parameters

<i>name</i>	channel name
-------------	--------------

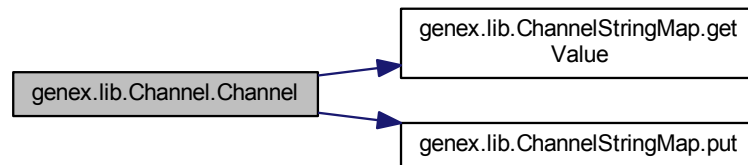
6.5.2.5 `genex.lib.Channel.Channel ( ImagePlus img, ChannelNames channel )`

Constructs the [Channel](#) object using the input image and channel identifier

## Parameters

<i>img</i>	input image
<i>channel</i>	channel identifier <a href="#">GenExDefines.ChannelNames</a>

Here is the call graph for this function:



### 6.5.3 Member Function Documentation

**6.5.3.1** `ArrayList<ExtRoi> genex.lib.Channel.analyzeParticles ( final int measurements, final int minArea, final int maxArea, final double minCirc, final double maxCirc )`

ImageJ Particle analysis

Parameters

<i>measurements</i>	measurements to be performed, as defined by <a href="http://imagej.nih.gov/ij/developer/api/ij/measure/Measurements.html">http://imagej.nih.gov/ij/developer/api/ij/measure/Measurements.html</a>
<i>minArea</i>	minimum area of particles
<i>maxArea</i>	maximum area of particles
<i>minCirc</i>	minimum circularity of particles
<i>maxCirc</i>	maximum circularity of particles

Returns

**6.5.3.2** `ImagePlus genex.lib.Channel.denoise ( final Filters filtGaussian )`

Implements selection of single channel from the RGB input stack.

Parameters

<i>stack</i>	input stack of RGB images
<i>channelName</i>	channel selector ("RED"/"GREEN"/"DAPI"/"BLUE")

Returns

selected channel (ImagePlus) or null if the selector is not valid Implements selection of single channel from the RGB input stack.

Parameters

<i>stack</i>	input stack of RGB images
<i>channelName</i>	channel selector ("RED"/"GREEN"/"DAPI"/"BLUE")

Returns

selected channel (ImagePlus) or null if the selector is not valid Noise supression by deconvolution with a Gaussian kernel or median filter.

## Parameters

<i>filtGaussian</i>	defined in <a href="#">GenExDefines</a>
---------------------	---

## Returns

denoised image

6.5.3.3 ImagePlus `genex.lib.Channel.getBinImg ( )`

## Returns

binary image

6.5.3.4 **ChannelNames** `genex.lib.Channel.getChannelName ( )` [protected]

## Returns

channel descriptor as defined by [GenExDefines.ChannelNames](#)

6.5.3.5 **String** `genex.lib.Channel.getChanString ( ChannelNames channel )`

Convert channel descriptor as defined by [GenExDefines.ChannelNames](#) to channel name (String) "DAPI"/"GREEN"/"RED"

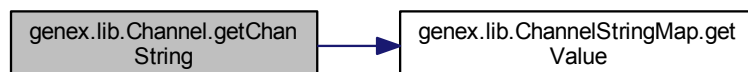
## Parameters

<i>channel</i>	channel descriptor
----------------	--------------------

## Returns

channel name

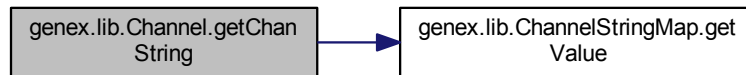
Here is the call graph for this function:

6.5.3.6 **String** `genex.lib.Channel.getChanString ( )`

**Returns**

channel name (String) "DAPI"/"GREEN"/"RED"

Here is the call graph for this function:

**6.5.3.7 int genex.lib.Channel.getStackLength ( )****Returns**

number of images to process before saving results Set number of images to process before saving results

**Parameters**

<i>nImages</i>	
----------------	--

**Returns**

stack length - number of images to process

**6.5.3.8 void genex.lib.Channel.normalizeIntensity ( final int *maxIntensity* )**

Non-linear intensity normalization. Estimates background threshold as image mean + 3\*std and foreground threshold as mean + 7\*std. If the image max intensity is between foreground threshold and *maxIntensity* parameter, everything above background threshold is scaled so that the max intensity reaches the *maxIntensity* value.

**Parameters**

<i>maxIntensity</i>	maximum required intensity
---------------------	----------------------------

**6.5.3.9 void genex.lib.Channel.preprocessing ( final Filters *filtMedian*, final boolean *despeckle*, final int *radiusBackground* )**

Preprocessing: median filter, background correction with rolling ball filter

**Parameters**

<i>filtMedian</i>	filter type for denoising <code>FILT_MEDIAN</code> , <code>FILT_GAUSSIAN</code> , <code>FILT_NONE</code>
<i>despeckle</i>	use median filter with small radius (1.0) to despeckle
<i>radiusBackground</i>	filter radius for rolling ball background correction

**6.5.3.10 void genex.lib.Channel.setBinImg ( ImagePlus *binImg* )**

Assign binary image to the channel

## Parameters

<i>binImg</i>	
---------------	--

6.5.3.11 void genex.lib.Channel.setImage ( final ImagePlus *img* )

6.5.3.12 void genex.lib.Channel.showBinary ( )

Display binary image

## 6.5.4 Member Data Documentation

6.5.4.1 ImagePlus genex.lib.Channel.img

6.5.4.2 int genex.lib.Channel.maxArea [package]

6.5.4.3 double genex.lib.Channel.maxCirc [package]

6.5.4.4 int genex.lib.Channel.minArea [package]

6.5.4.5 double genex.lib.Channel.minCirc [package]

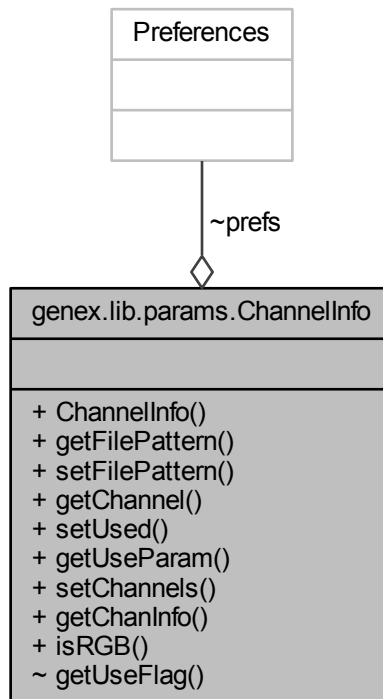
6.5.4.6 ResultsTable genex.lib.Channel.results = new ResultsTable() [protected]

The documentation for this class was generated from the following file:

- src/genex/lib/[Channel.java](#)

## 6.6 genex.lib.params.ChannelInfo Class Reference

Collaboration diagram for genex.lib.params.ChannelInfo:



### Public Member Functions

- [ChannelInfo](#) ([ChannelNames](#) channel)
- String [getFilePattern](#) ()
- void [setFilePattern](#) (String filePattern)
- [ChannelNames](#) [getChannel](#) ()
- void [setUsed](#) (Boolean used)
- void [getUseParam](#) ()
- void [setChannels](#) (ArrayList< [ChannelInfo](#) > channelInfo)
- ArrayList< [ChannelInfo](#) > [getChanInfo](#) ()
- Boolean [isRGB](#) ()

### Package Functions

- Boolean [getUseFlag](#) ()

### Package Attributes

- final Preferences [prefs](#) = Preferences.userRoot().node([ParamDefines.PREFS\\_ROOT](#))



### 6.6.1 Detailed Description

Class for storing information about channel parameters (channel usage, filename pattern, channel Id)

Author

J. Schier, B. Kovář

### 6.6.2 Constructor & Destructor Documentation

#### 6.6.2.1 `genex.lib.params.ChannelInfo.ChannelInfo ( ChannelNames channel )`

Constructor

Parameters

<i>channel</i>	channel identifier (see <a href="#">genex.lib.GenExDefines.ChannelNames</a> )
----------------	---

Here is the call graph for this function:



### 6.6.3 Member Function Documentation

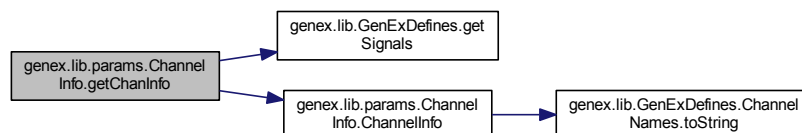
#### 6.6.3.1 `ArrayList<ChannelInfo> genex.lib.params.ChannelInfo.getChanInfo ( )`

Read information about channels from Preferences, populate [ChannelInfo](#) records

Returns

list of [ChannelInfo](#) records

Here is the call graph for this function:



#### 6.6.3.2 `ChannelNames genex.lib.params.ChannelInfo.getChannel ( )`

Get channel identifier

## Returns

identifier (see [genex.lib.GenExDefines.ChannelNames](#))

### 6.6.3.3 String `genex.lib.params.ChannellInfo.getFilePattern ( )`

## Returns

the file pattern of images belonging to channel

### 6.6.3.4 Boolean `genex.lib.params.ChannellInfo.getUseFlag ( )` [package]

Get the channel use flag

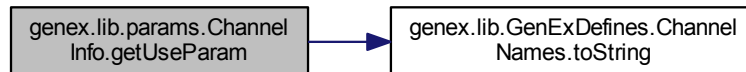
## Returns

used

### 6.6.3.5 void `genex.lib.params.ChannellInfo.getUseParam ( )`

Read use flag for the given [ChannellInfo](#) record from the Preferences

Here is the call graph for this function:



### 6.6.3.6 Boolean `genex.lib.params.ChannellInfo.isRGB ( )`

### 6.6.3.7 void `genex.lib.params.ChannellInfo.setChannels ( ArrayList< ChannellInfo > channellInfo )`

Set local `channellInfo` list to the list in parameter

## Parameters

<i>channellInfo</i>	list of channel information records
---------------------	-------------------------------------

### 6.6.3.8 void `genex.lib.params.ChannellInfo.setFilePattern ( String filePattern )`

Set file pattern for images belonging to the channel

## Parameters

<i>filePattern</i>	the file pattern to set
--------------------	-------------------------

#### 6.6.3.9 void genex.lib.params.ChannelInfo.setUsed ( Boolean *used* )

Set the channel use flag

Parameters

<i>used</i>	the flag value
-------------	----------------

### 6.6.4 Member Data Documentation

#### 6.6.4.1 final Preferences genex.lib.params.ChannelInfo.prefs = Preferences.userRoot().node(ParamDefines.PREFS\_ROOT) [package]

The documentation for this class was generated from the following file:

- src/genex/lib/params/[ChannelInfo.java](#)

## 6.7 genex.lib.GenExDefines.ChannelNames Enum Reference

Collaboration diagram for genex.lib.GenExDefines.ChannelNames:

genex.lib.GenExDefines.ChannelNames
+ DAPI + RED + GREEN + UNSPECIFIED
+ toString()

### Public Member Functions

- String [toString](#) ()

### Public Attributes

- [DAPI](#) =("DAPI")
  - [RED](#) =("RED")
  - [GREEN](#) =("GREEN")
  - [UNSPECIFIED](#) =("")
-

### 6.7.1 Detailed Description

Definition of channel identifiers

Author

J. Schier

### 6.7.2 Member Function Documentation

6.7.2.1 String `genex.lib.GenExDefines.ChannelNames.toString ( )`

### 6.7.3 Member Data Documentation

6.7.3.1 `genex.lib.GenExDefines.ChannelNames.DAPI =("DAPI")`

6.7.3.2 `genex.lib.GenExDefines.ChannelNames.GREEN =("GREEN")`

6.7.3.3 `genex.lib.GenExDefines.ChannelNames.RED =("RED")`

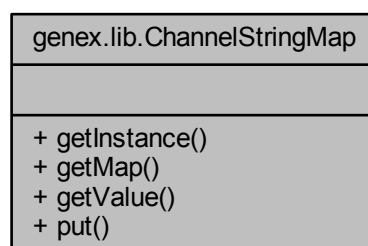
6.7.3.4 `genex.lib.GenExDefines.ChannelNames.UNSPECIFIED =("")`

The documentation for this enum was generated from the following file:

- `src/genex/lib/GenExDefines.java`

## 6.8 `genex.lib.ChannelStringMap` Class Reference

Collaboration diagram for `genex.lib.ChannelStringMap`:



### Static Public Member Functions

- static `ChannelStringMap getInstance ()`
- static `HashMap< ChannelNames, String > getMap ()`
- static `String getValue (ChannelNames key)`
- static void `put (ChannelNames chanName, String chanString)`

### 6.8.1 Detailed Description

Helper class for conversion between ChannelName ID and channel String descriptor

Author

schier

### 6.8.2 Member Function Documentation

6.8.2.1 static ChannelStringMap genex.lib.ChannelStringMap.getInstance ( ) [static]

6.8.2.2 static HashMap<ChannelNames, String> genex.lib.ChannelStringMap.getMap ( ) [static]

6.8.2.3 static String genex.lib.ChannelStringMap.getValue ( ChannelNames key ) [static]

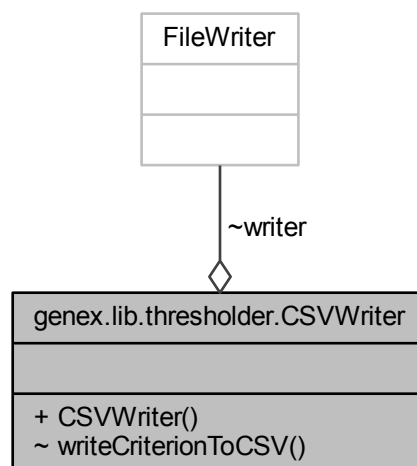
6.8.2.4 static void genex.lib.ChannelStringMap.put ( ChannelNames chanName, String chanString ) [static]

The documentation for this class was generated from the following file:

- [src/genex/lib/ChannelStringMap.java](#)

## 6.9 genex.lib.threshold.CSVWriter Class Reference

Collaboration diagram for genex.lib.threshold.CSVWriter:



### Public Member Functions

- [CSVWriter](#) (String dir, String filename, String descriptor) throws Exception

## Package Functions

- void [writeCriterionToCSV](#) (Map< Integer, Double > criterion) throws Exception

## Package Attributes

- FileWriter [writer](#)

### 6.9.1 Constructor & Destructor Documentation

- 6.9.1.1 `genex.lib.threshold.CSVWriter.CSVWriter ( String dir, String filename, String descriptor )` throws Exception

### 6.9.2 Member Function Documentation

- 6.9.2.1 `void genex.lib.threshold.CSVWriter.writeCriterionToCSV ( Map< Integer, Double > criterion )` throws Exception  
[package]

### 6.9.3 Member Data Documentation

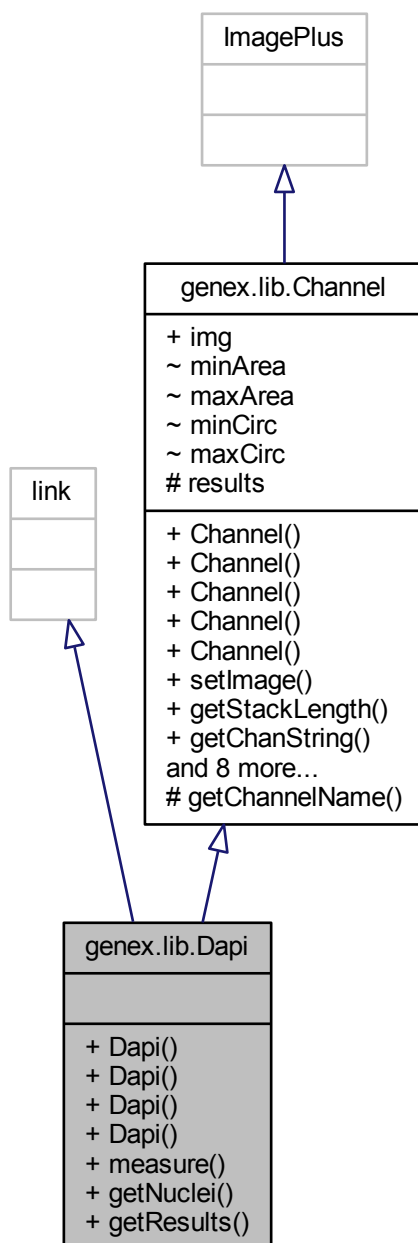
- 6.9.3.1 `FileWriter genex.lib.threshold.CSVWriter.writer` [package]

The documentation for this class was generated from the following file:

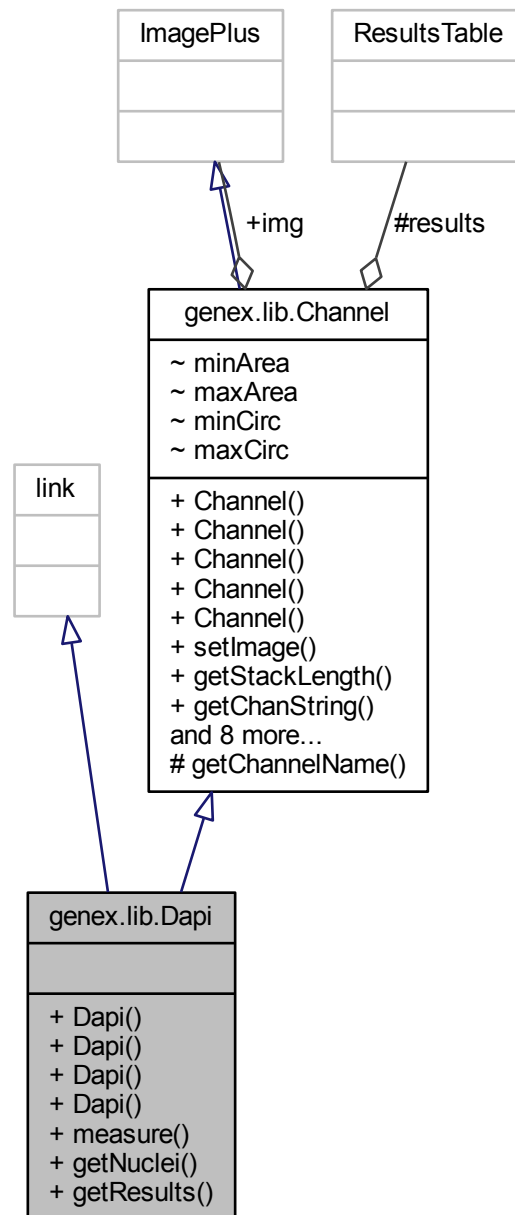
- `src/genex/lib/threshold/CSVWriter.java`
-

## 6.10 genex.lib.Dapi Class Reference

Inheritance diagram for genex.lib.Dapi:



Collaboration diagram for genex.lib.Dapi:



## Public Member Functions

- [Dapi](#) (`ImageStack[] stack`, `String channelName`)
- [Dapi](#) (`ImageStack[] stack`, [ChannelNames](#) channel)
- [Dapi](#) (`ImagePlus img`)
- [Dapi](#) ()
- `ResultsTable` [measure](#) (final int measurements, final int [minArea](#), final int [maxArea](#), final double [minCirc](#), final double [maxCirc](#))
- `ArrayList< ExtRoi >` [getNuclei](#) ()



- ResultsTable [getResults](#) ()

## Additional Inherited Members

### 6.10.1 Detailed Description

Class for representation and processing of the DAPI channel [genex.lib.Channel](#)

Author

J. Schier

### 6.10.2 Constructor & Destructor Documentation

#### 6.10.2.1 [genex.lib.Dapi.Dapi](#) ( [ImageStack](#)[] *stack*, [String](#) *channelName* )

Class constructor

Parameters

<i>stack</i>	input RGB image stack
<i>channelName</i>	channel to be extracted

#### 6.10.2.2 [genex.lib.Dapi.Dapi](#) ( [ImageStack](#)[] *stack*, [ChannelNames](#) *channel* )

Class constructor

Parameters

<i>stack</i>	input RGB image stack
<i>channel</i>	channel to be extracted <a href="#">GenExDefines.ChannelNames</a>

#### 6.10.2.3 [genex.lib.Dapi.Dapi](#) ( [ImagePlus](#) *img* )

Class constructor

Parameters

<i>img</i>	single channel input stack, pointed by ImagePlus
------------	--

#### 6.10.2.4 [genex.lib.Dapi.Dapi](#) ( )

### 6.10.3 Member Function Documentation

#### 6.10.3.1 [ArrayList](#)<[ExtRoi](#)> [genex.lib.Dapi.getNuclei](#) ( )

Returns

list of nuclei ([ExtRoi](#) [genex.lib.ExtRoi](#)) contained in the DAPI channel

#### 6.10.3.2 [ResultsTable](#) [genex.lib.Dapi.getResults](#) ( )

**Returns**

ResultTable DAPI results table (see <http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html>)

**6.10.3.3 ResultsTable** `genex.lib.Dapi.measure ( final int measurements, final int minArea, final int maxArea, final double minCirc, final double maxCirc )`

Analyze and measure the particles contained in the image

**Parameters**

<i>measurements</i>	the parameters to be measured
<i>minArea</i>	minimum area of the particles
<i>maxArea</i>	maximum area of the particles
<i>minCirc</i>	minimum circularity of the particles
<i>maxCirc</i>	minimum circularity of the particles

**Returns**

ImageJ result table (see <http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html>)

Here is the call graph for this function:

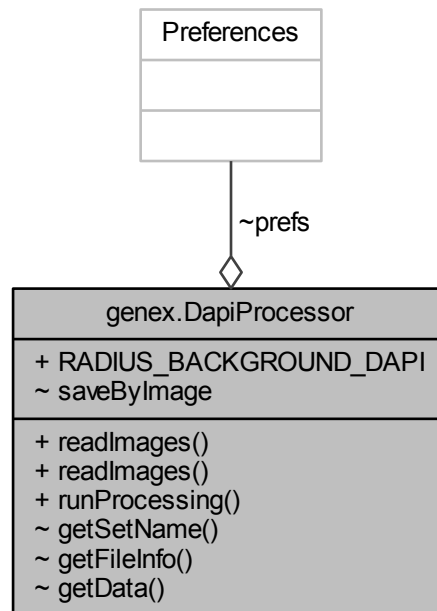


The documentation for this class was generated from the following file:

- [src/genex/lib/Dapi.java](#)

## 6.11 genex.DapiProcessor Class Reference

Collaboration diagram for genex.DapiProcessor:



### Public Member Functions

- int [readImages](#) ()
- int [readImages](#) (String fname)
- [Dapi runProcessing](#) (final int measures, final boolean saveResults, final boolean exportRoi)

### Public Attributes

- final int [RADIUS\\_BACKGROUND\\_DAPI](#) = 50

### Package Functions

- String [getSetName](#) ()
- FileInfo [getFileInfo](#) ()
- FISHdata [getData](#) ()

### Package Attributes

- final Preferences [prefs](#) = Preferences.userRoot().node([ParamDefines.PREFS\\_ROOT](#))
- boolean [saveByImage](#) = prefs.getBoolean([ParamDefines.PROCESS\\_BY\\_IMAGE](#), true)

### 6.11.1 Detailed Description

Author

schier

### 6.11.2 Member Function Documentation

6.11.2.1 **FISHdata** `genex.DapiProcessor.getData ( )` [package]

6.11.2.2 **FileInfo** `genex.DapiProcessor.getFileInfo ( )` [package]

Returns

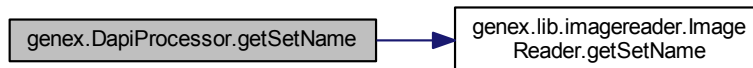
file information about the input set

6.11.2.3 **String** `genex.DapiProcessor.getSetName ( )` [package]

Returns

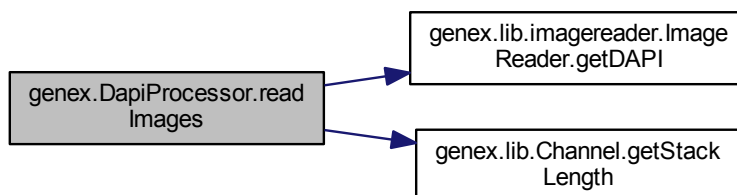
name of the input set

Here is the call graph for this function:



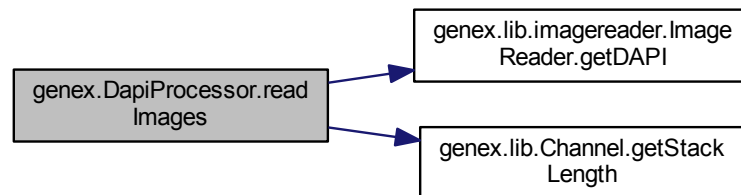
6.11.2.4 **int** `genex.DapiProcessor.readImages ( )`

Here is the call graph for this function:



#### 6.11.2.5 int genex.DapiProcessor.readImages ( String *fname* )

Here is the call graph for this function:



#### 6.11.2.6 Dapi genex.DapiProcessor.runProcessing ( final int *measures*, final boolean *saveResults*, final boolean *exportRoi* )

process the DAPI channel - includes background subtraction, intensity normalization, segmentation, particle measurement and filtering

##### Parameters

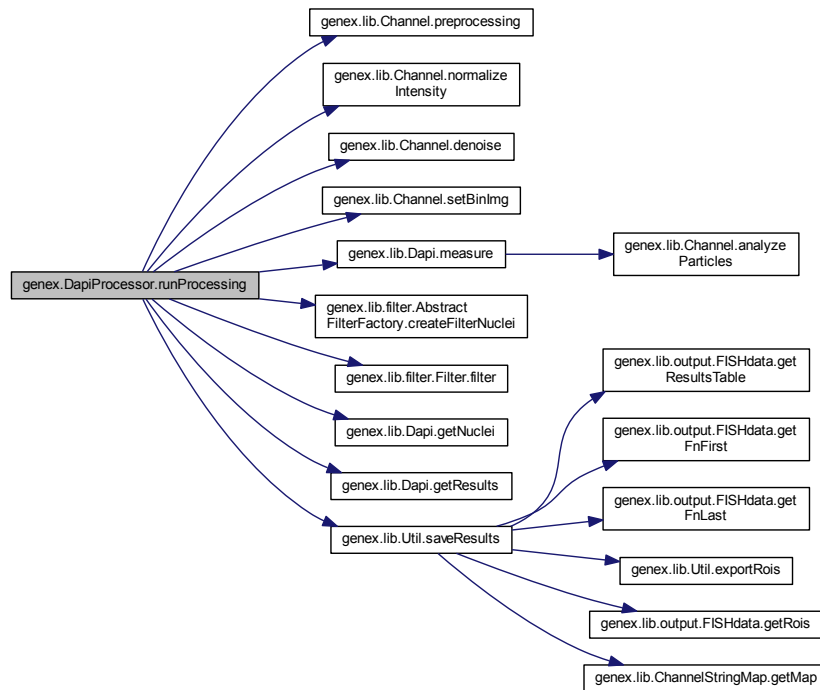
<i>measures</i>	particle parameters to be measured
<i>saveResults</i>	boolean: save results to file
<i>exportRoi</i>	boolean: save Rois to file

##### Returns

Dapi object

---

Here is the call graph for this function:



### 6.11.3 Member Data Documentation

6.11.3.1 `final Preferences genex.DapiProcessor.prefs = Preferences.userRoot().node(ParamDefines.PREFS_ROOT)`  
[package]

6.11.3.2 `final int genex.DapiProcessor.RADIUS_BACKGROUND_DAPI = 50`

Filter radius - DAPI background subtraction

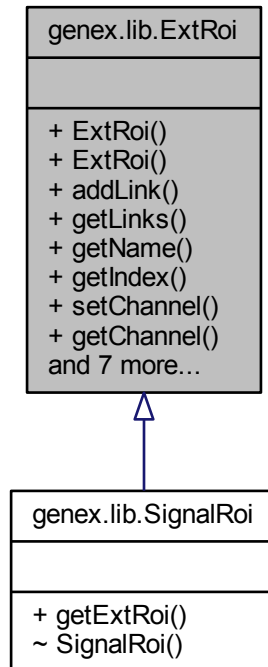
6.11.3.3 `boolean genex.DapiProcessor.saveByImage = prefs.getBoolean(ParamDefines.PROCESS_BY_IMAGE, true)`  
[package]

The documentation for this class was generated from the following file:

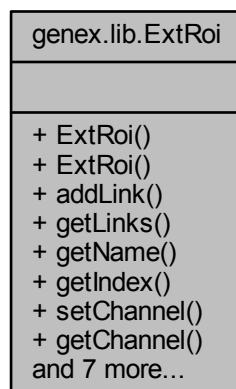
- [src/genex/DapiProcessor.java](#)

## 6.12 genex.lib.ExtRoi Class Reference

Inheritance diagram for genex.lib.ExtRoi:



Collaboration diagram for genex.lib.ExtRoi:



## Public Member Functions

- [ExtRoi](#) (Roi roi, String fname, [ChannelNames](#) chanName, int idx)
- [ExtRoi](#) (Roi roi, String fname, boolean valid, [ChannelNames](#) chanName, int idx)
- void [addLink](#) ([ExtRoi](#) roi)
- ArrayList< [ExtRoi](#) > [getLinks](#) ()
- String [getName](#) ()
- int [getIndex](#) ()
- void [setChannel](#) ([ChannelNames](#) channel)
- [ChannelNames](#) [getChannel](#) ()
- void [setRoi](#) (Roi roi)
- Roi [getRoi](#) ()
- String [getFname](#) ()
- void [setValidity](#) (boolean valid)
- boolean [getValidity](#) ()
- void [disable](#) ()
- void [enable](#) ()

### 6.12.1 Detailed Description

Extended ROI, contains the Roi as defined by ImageJ (<http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html>) with added validity flag, channel name and link to parent (DAPI) or child (signal) object

#### Author

J. Schier

### 6.12.2 Constructor & Destructor Documentation

#### 6.12.2.1 `genex.lib.ExtRoi.ExtRoi ( Roi roi, String fname, ChannelNames chanName, int idx )`

Extended Roi constructor. Roi validity set to true.

##### Parameters

<i>roi</i>	ImageJ ROI ( <a href="http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html">http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html</a> )
<i>fname</i>	file name - image that contains this roi
<i>chanName</i>	channel identifier
<i>idx</i>	Index of this Roi. Must be unique in the given channel.

#### 6.12.2.2 `genex.lib.ExtRoi.ExtRoi ( Roi roi, String fname, boolean valid, ChannelNames chanName, int idx )`

Extended Roi constructor. Roi validity set to true.

##### Parameters

<i>roi</i>	ImageJ ROI ( <a href="http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html">http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html</a> )
<i>fname</i>	file name - image that contains this roi
<i>valid</i>	validity of this Roi
<i>chanName</i>	channel identifier
<i>idx</i>	Index of this Roi. Must be unique in the given channel.



### 6.12.3 Member Function Documentation

#### 6.12.3.1 void genex.lib.ExtRoi.addLink ( ExtRoi *roi* )

Add link to Roi in parameter Typically used to add link to a signal to the DAPI nucleus

## Parameters

<i>roi</i>	Roi to be linked
------------	------------------

**6.12.3.2 void genex.lib.ExtRoi.disable ( )**

Disable (set validity to false) this Roi and (if the Roi is in DAPI) the associated signals

**6.12.3.3 void genex.lib.ExtRoi.enable ( )**

Enable (set validity to true) this Roi

**6.12.3.4 ChannelNames genex.lib.ExtRoi.getChannel ( )**

## Returns

channel identifier (see linkGenExDefines.ChannelNames)

**6.12.3.5 String genex.lib.ExtRoi.getFname ( )**

## Returns

the name of the file that contains this roi

**6.12.3.6 int genex.lib.ExtRoi.getIndex ( )**

## Returns

index of this Roi

**6.12.3.7 ArrayList<ExtRoi> genex.lib.ExtRoi.getLinks ( )**

Get the Rois linked to this Roi Typically used to get all signals associated with a nucleus

## Returns

List of extended Rois

**6.12.3.8 String genex.lib.ExtRoi.getName ( )**

## Returns

name of the associated ImageJ Roi

**6.12.3.9 Roi genex.lib.ExtRoi.getRoi ( )**

## Returns

ImageJ Roi boundary associated with this Extended Roi

---

### 6.12.3.10 boolean genex.lib.ExtRoi.getValidity ( )

#### Returns

validity of this Roi

### 6.12.3.11 void genex.lib.ExtRoi.setChannel ( ChannelNames *channel* )

Set the channel identifier (see linkGenExDefines.ChannelNames)@paramchannel

### 6.12.3.12 void genex.lib.ExtRoi.setRoi ( Roi *roi* )

Set the ImageJ Roi boundary associated with this Extended Roi

#### Parameters

<i>roi</i>	
------------	--

### 6.12.3.13 void genex.lib.ExtRoi.setValidity ( boolean *valid* )

Set validity of this Roi

#### Parameters

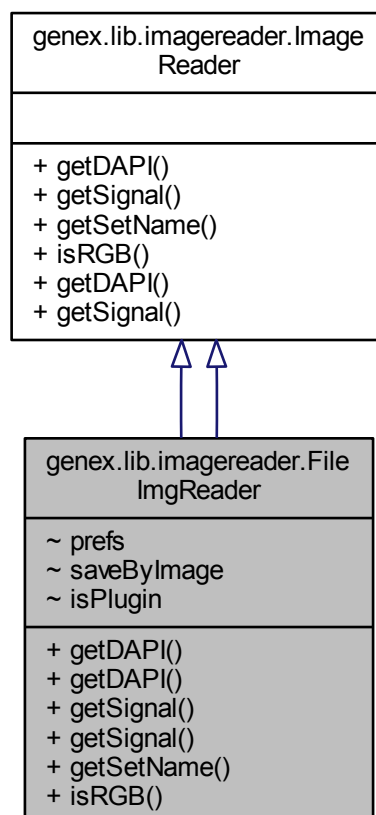
<i>valid</i>	
--------------	--

The documentation for this class was generated from the following file:

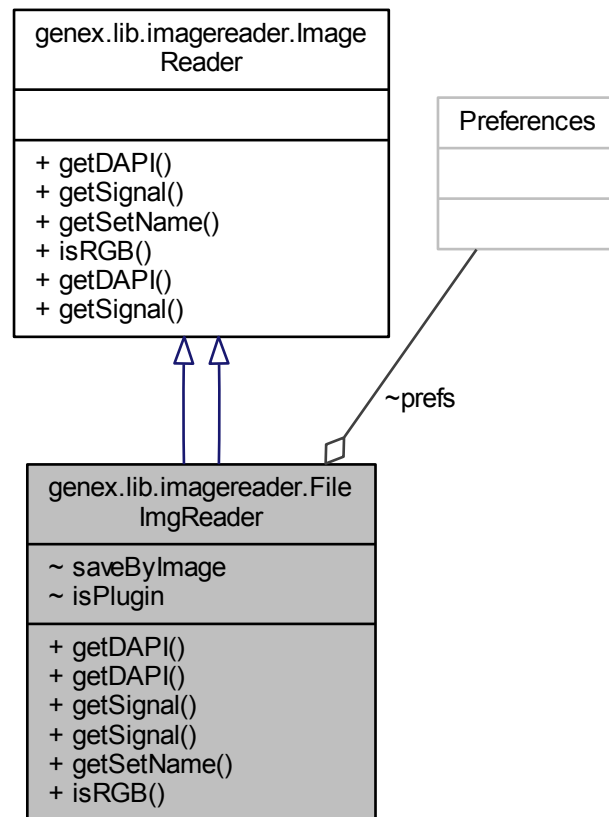
- src/genex/lib/[ExtRoi.java](#)

## 6.13 genex.lib.imagereader.FileImgReader Class Reference

Inheritance diagram for genex.lib.imagereader.FileImgReader:



Collaboration diagram for genex.lib.imagereader.FileImgReader:



## Public Member Functions

- [Dapi getDAPI \(\)](#)
- [Dapi getDAPI \(String filename\)](#)
- [SigChannel getSignal \(ChannelNames channel\)](#)
- [SigChannel getSignal \(String filename, ChannelNames channel\)](#)
- String [getSetName \(\)](#)
- boolean [isRGB \(\)](#)

## Package Attributes

- final Preferences [prefs](#) = Preferences.userRoot().node([ParamDefines.PREFS\\_ROOT](#))
- boolean [saveByImage](#) = prefs.getBoolean([ParamDefines.PROCESS\\_BY\\_IMAGE](#), true)
- boolean [isPlugin](#) = prefs.getBoolean([ParamDefines.IS\\_PLUGIN](#), true)

### 6.13.1 Detailed Description

Reads sequence of images from a disk directory to selected channel Images are identified by parameters stored in ChannelInfo object (directory, filename pattern, used/unused channel) These parameters are set using the [GenExParams](#) plugin and saved using java.util.prefs.Preferences

**Author**

Bohumil Kovar, Jan Schier

**6.13.2 Member Function Documentation****6.13.2.1 Dapi** `genex.lib.imagereader.FileImgReader.getDAPI ( )`

Get the DAPI channel

**Returns**

object containing the DAPI image

Implements [genex.lib.imagereader.ImageReader](#).

**6.13.2.2 Dapi** `genex.lib.imagereader.FileImgReader.getDAPI ( String filename )`

Get the DAPI channel Returns null if the filename is not found

**Parameters**

<i>filename</i>	name of image to read
-----------------	-----------------------

**Returns**

object containing the DAPI image

Implements [genex.lib.imagereader.ImageReader](#).

**6.13.2.3 String** `genex.lib.imagereader.FileImgReader.getSetName ( )`

Get the name of the image set

**Returns**

set name

Implements [genex.lib.imagereader.ImageReader](#).

**6.13.2.4 SigChannel** `genex.lib.imagereader.FileImgReader.getSignal ( ChannelNames channel )`

Get single signal channel

**Parameters**

<i>channel</i>	string, denoting the channel: "RED", "GREEN"
----------------	--

**Returns**

signal channel

Implements [genex.lib.imagereader.ImageReader](#).

**6.13.2.5 SigChannel** `genex.lib.imagereader.FileImgReader.getSignal ( String filename, ChannelNames channel )`

Get single signal channel Returns null if the filename is not found

---

## Parameters

<i>filename</i>	name of image to read
<i>channel</i>	string, denoting the channel: "RED", "GREEN"

## Returns

signal channel

Implements [genex.lib.imagereader.ImageReader](#).

#### 6.13.2.6 boolean genex.lib.imagereader.FileImgReader.isRGB ( )

## Returns

true for RGB input images

Implements [genex.lib.imagereader.ImageReader](#).

### 6.13.3 Member Data Documentation

**6.13.3.1** boolean genex.lib.imagereader.FileImgReader.isPlugin = prefs.getBoolean(ParamDefines.IS\_PLUGIN, true)  
[package]

**6.13.3.2** final Preferences genex.lib.imagereader.FileImgReader.prefs = Preferences.userRoot().node(ParamDefines.PREFS\_ROOT)  
[package]

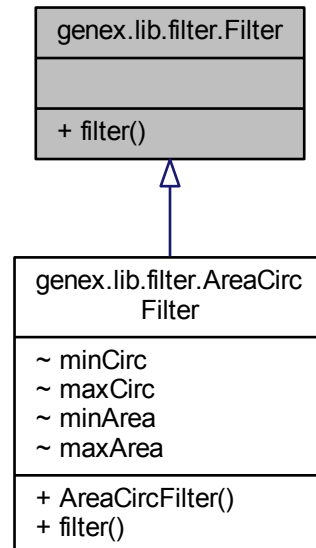
**6.13.3.3** boolean genex.lib.imagereader.FileImgReader.saveByImage = prefs.getBoolean(ParamDefines.PROCESS\_BY\_IMAGE, true)  
[package]

The documentation for this class was generated from the following file:

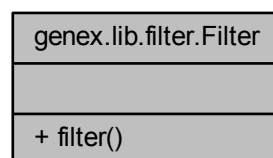
- src/genex/lib/imagereader/[FileImgReader.java](#)

## 6.14 genex.lib.filter.Filter Interface Reference

Inheritance diagram for `genex.lib.filter.Filter`:



Collaboration diagram for `genex.lib.filter.Filter`:



### Public Member Functions

- void `filter` (`ArrayList`< `ExtRoi` > *rois*, `ResultsTable` *results*)

### 6.14.1 Member Function Documentation

6.14.1.1 void `genex.lib.filter.Filter.filter` ( `ArrayList`< `ExtRoi` > *rois*, `ResultsTable` *results* )

Implemented in `genex.lib.filter.AreaCircFilter`.

The documentation for this interface was generated from the following file:

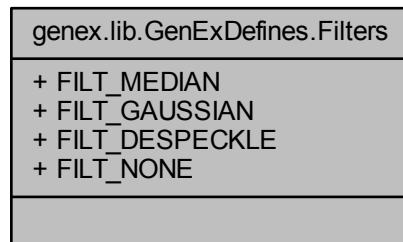
---



- [src/genex/lib/filter/Filter.java](#)

## 6.15 genex.lib.GenExDefines.Filters Enum Reference

Collaboration diagram for genex.lib.GenExDefines.Filters:



### Public Attributes

- [FILT\\_MEDIAN](#)
- [FILT\\_GAUSSIAN](#)
- [FILT\\_DESPECKLE](#)
- [FILT\\_NONE](#)

### 6.15.1 Detailed Description

Filter identifiers for channel denoising

#### Author

J. Schier

### 6.15.2 Member Data Documentation

6.15.2.1 `genex.lib.GenExDefines.Filters.FILT_DESPECKLE`

6.15.2.2 `genex.lib.GenExDefines.Filters.FILT_GAUSSIAN`

6.15.2.3 `genex.lib.GenExDefines.Filters.FILT_MEDIAN`

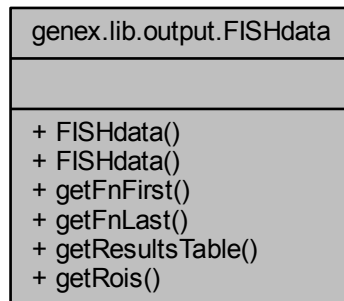
6.15.2.4 `genex.lib.GenExDefines.Filters.FILT_NONE`

The documentation for this enum was generated from the following file:

- [src/genex/lib/GenExDefines.java](#)

## 6.16 genex.lib.output.FISHdata Class Reference

Collaboration diagram for genex.lib.output.FISHdata:



### Public Member Functions

- [FISHdata](#) (ResultsTable results, ArrayList< [ExtRoi](#) > rois)
- [FISHdata](#) (ResultsTable results, ArrayList< [ExtRoi](#) > rois, String fnFirst, String fnLast)
- String [getFnFirst](#) ()
- String [getFnLast](#) ()
- ResultsTable [getResultsTable](#) ()
- ArrayList< [ExtRoi](#) > [getRois](#) ()

### 6.16.1 Detailed Description

Helper class to store ResultTable and extended Rois for one channel together.

Author

J. Schier

### 6.16.2 Constructor & Destructor Documentation

#### 6.16.2.1 genex.lib.output.FISHdata.FISHdata ( ResultsTable *results*, ArrayList< [ExtRoi](#) > *rois* )

Constructor

Parameters

<i>results</i>	ResultsTable (see <a href="http://imagej.nih.gov/ij/developer/api/ij/measurement/ResultsTable.html">http://imagej.nih.gov/ij/developer/api/ij/measurement/ResultsTable.html</a> )
<i>rois</i>	Extended Rois (see <a href="#">ExtRoi</a> )

#### 6.16.2.2 genex.lib.output.FISHdata.FISHdata ( ResultsTable *results*, ArrayList< [ExtRoi](#) > *rois*, String *fnFirst*, String *fnLast* )

Constructor

---

## Parameters

<i>results</i>	ResultsTable (see <a href="http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html">http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html</a> )
<i>rois</i>	Extended Rois (see <a href="#">ExtRoi</a> )
<i>fnFirst</i>	filename of the first image processed
<i>fnLast</i>	filename of the last image processed

## 6.16.3 Member Function Documentation

6.16.3.1 String `genex.lib.output.FISHdata.getFnFirst ( )`

6.16.3.2 String `genex.lib.output.FISHdata.getFnLast ( )`

6.16.3.3 ResultsTable `genex.lib.output.FISHdata.getResultsTable ( )`

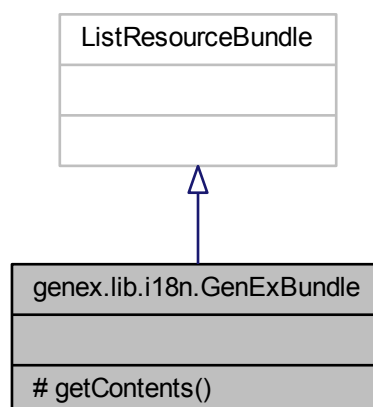
6.16.3.4 ArrayList<ExtRoi> `genex.lib.output.FISHdata.getRois ( )`

The documentation for this class was generated from the following file:

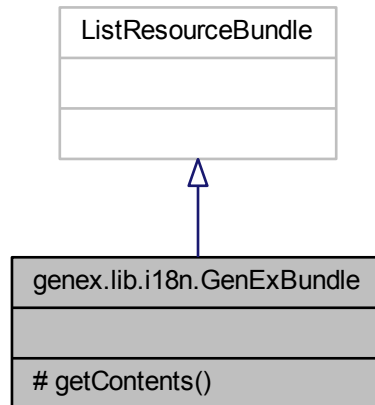
- `src/genex/lib/output/FISHdata.java`

## 6.17 genex.lib.i18n.GenExBundle Class Reference

Inheritance diagram for `genex.lib.i18n.GenExBundle`:



Collaboration diagram for genex.lib.i18n.GenExBundle:



## Protected Member Functions

- `Object[][] getContents ()`

### 6.17.1 Detailed Description

Author

schier

### 6.17.2 Member Function Documentation

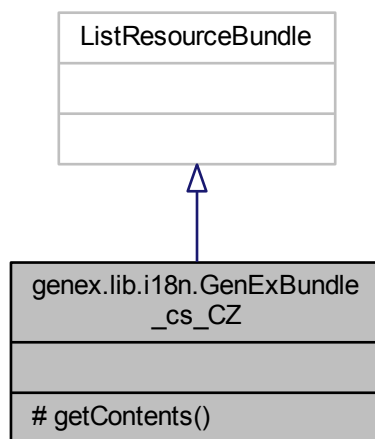
6.17.2.1 `Object [][] genex.lib.i18n.GenExBundle.getContents ( )` `[protected]`

The documentation for this class was generated from the following file:

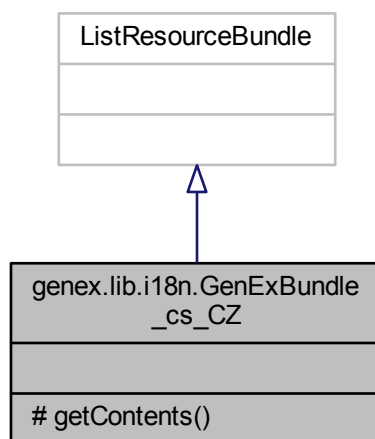
- `src/genex/lib/i18n/GenExBundle.java`

## 6.18 genex.lib.i18n.GenExBundle\_cs\_CZ Class Reference

Inheritance diagram for genex.lib.i18n.GenExBundle\_cs\_CZ:



Collaboration diagram for genex.lib.i18n.GenExBundle\_cs\_CZ:



### Protected Member Functions

- Object[][] [getContents](#) ()

### 6.18.1 Detailed Description

---

Author

schier

## 6.18.2 Member Function Documentation

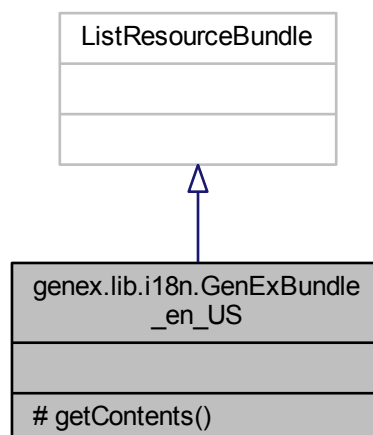
### 6.18.2.1 Object [][] genex.lib.i18n.GenExBundle\_cs\_CZ.getContents ( ) [protected]

The documentation for this class was generated from the following file:

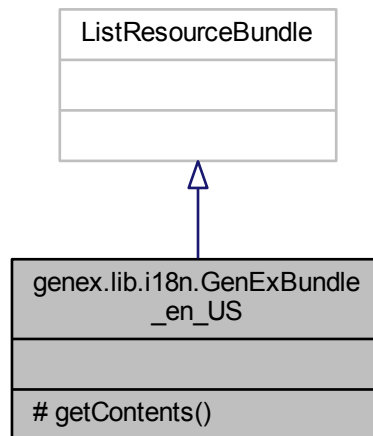
- [src/genex/lib/i18n/GenExBundle\\_cs\\_CZ.java](#)

## 6.19 genex.lib.i18n.GenExBundle\_en\_US Class Reference

Inheritance diagram for genex.lib.i18n.GenExBundle\_en\_US:



Collaboration diagram for genex.lib.i18n.GenExBundle\_en\_US:



## Protected Member Functions

- `Object[][] getContents ()`

### 6.19.1 Detailed Description

Author

schier

### 6.19.2 Member Function Documentation

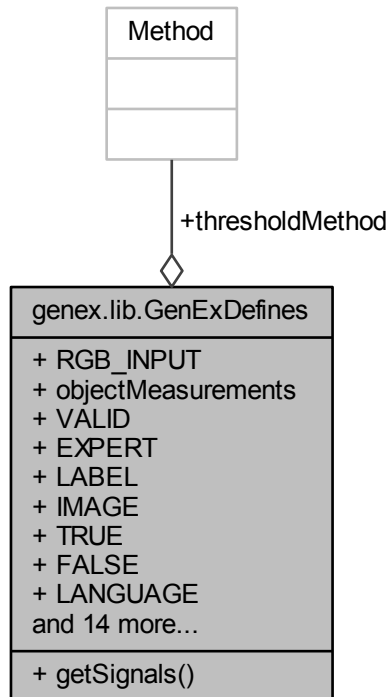
6.19.2.1 `Object[][] genex.lib.i18n.GenExBundle\_en\_US.getContents ( )` `[protected]`

The documentation for this class was generated from the following file:

- `src/genex/lib/i18n/GenExBundle\_en\_US.java`

## 6.20 genex.lib.GenExDefines Class Reference

Collaboration diagram for genex.lib.GenExDefines:



### Classes

- enum [ChannelNames](#)
- enum [Filters](#)

### Public Member Functions

- [ChannelNames\[\]](#) [getSignals](#) ()

### Public Attributes

- final String [RGB\\_INPUT](#) = "RGB\_INPUT"

### Static Public Attributes

- static Method [thresholdMethod](#) = AutoThresholdMethod.Otsu
  - static int [objectMeasurements](#)
  - static String [VALID](#) = "Valid"
  - static String [EXPERT](#) = "Expert"
  - static String [LABEL](#) = "Label"
-



- static String `IMAGE` = "Image"
- static String `TRUE` = "true"
- static String `FALSE` = "false"
- static String `LANGUAGE` = "cs"
- static String `COUNTRY` = "CZ"
- static String `SELECT_DIR` = "Select image directory"
- static String `SELECT_CSV_DIR` = "Select directory for results"
- static String `ILLEGAL_CHAR` = "Illegal character in the file pattern\nor empty pattern"
- static String `ILLEGAL_CHAR_RGB` = "Illegal character in the file pattern"
- static String `INCORRECT_PATTERN` = "Incorrect file pattern: "
- static String `RGB_IMAGE` = "RGB image"
- static String `INPUT_PATTERN` = "Input file pattern"
- static String `SELECT_CHANNELS` = "Select channels"
- static String `FILE_PATTERNS` = "File patterns"
- static String `FILE_PATTERN` = "Input file pattern"
- static String `PATTERN` = "Pattern"
- static String `PATTERNS_FOR_CHANNELS` = "Select file patterns\nfor channels"
- static String `ERR_UNEQUAL_LENGTH` = "Channels of unequal length"

### 6.20.1 Detailed Description

Helper class, constants and definitions used in the project

Author

J. Schier

### 6.20.2 Member Function Documentation

6.20.2.1 `ChannelNames []` `genex.lib.GenExDefines.getSignals ( )`

Returns

names of fluorescence signals used in the library

### 6.20.3 Member Data Documentation

6.20.3.1 `String genex.lib.GenExDefines.COUNTRY = "CZ"` `[static]`

6.20.3.2 `String genex.lib.GenExDefines.ERR_UNEQUAL_LENGTH = "Channels of unequal length"` `[static]`

6.20.3.3 `String genex.lib.GenExDefines.EXPERT = "Expert"` `[static]`

6.20.3.4 `String genex.lib.GenExDefines.FALSE = "false"` `[static]`

6.20.3.5 `String genex.lib.GenExDefines.FILE_PATTERN = "Input file pattern"` `[static]`

6.20.3.6 `String genex.lib.GenExDefines.FILE_PATTERNS = "File patterns"` `[static]`

6.20.3.7 `String genex.lib.GenExDefines.ILLEGAL_CHAR = "Illegal character in the file pattern\nor empty pattern"` `[static]`

6.20.3.8 `String genex.lib.GenExDefines.ILLEGAL_CHAR_RGB = "Illegal character in the file pattern"` `[static]`

6.20.3.9 `String genex.lib.GenExDefines.IMAGE = "Image"` `[static]`

---

6.20.3.10 String genex.lib.GenExDefines.INCORRECT\_PATTERN = "Incorrect file pattern: " [static]

6.20.3.11 String genex.lib.GenExDefines.INPUT\_PATTERN = "Input file pattern" [static]

6.20.3.12 String genex.lib.GenExDefines.LABEL = "Label" [static]

6.20.3.13 String genex.lib.GenExDefines.LANGUAGE = "cs" [static]

6.20.3.14 int genex.lib.GenExDefines.objectMeasurements [static]

**Initial value:**

```
=
    ParticleAnalyzer.SLICE +
    ParticleAnalyzer.AREA +
    ParticleAnalyzer.CIRCULARITY +
    ParticleAnalyzer.PERIMETER +
    ParticleAnalyzer.MEAN +
    ParticleAnalyzer.CIRCULARITY +
    ParticleAnalyzer.RECT +
    ParticleAnalyzer.CENTER_OF_MASS +
    ParticleAnalyzer.SHAPE_DESCRIPTOR +
    ParticleAnalyzer.LABELS
```

6.20.3.15 String genex.lib.GenExDefines.PATTERN = "Pattern" [static]

6.20.3.16 String genex.lib.GenExDefines.PATTERNS\_FOR\_CHANNELS = "Select file patterns\nfor channels" [static]

6.20.3.17 String genex.lib.GenExDefines.RGB\_IMAGE = "RGB image" [static]

6.20.3.18 final String genex.lib.GenExDefines.RGB\_INPUT = "RGB\_INPUT"

GenEx library definitions and constants

**Author**

J. Schier

6.20.3.19 String genex.lib.GenExDefines.SELECT\_CHANNELS = "Select channels" [static]

6.20.3.20 String genex.lib.GenExDefines.SELECT\_CSV\_DIR = "Select directory for results" [static]

6.20.3.21 String genex.lib.GenExDefines.SELECT\_DIR = "Select image directory" [static]

6.20.3.22 Method genex.lib.GenExDefines.thresholdMethod = AutoThreshold.Method.Otsu [static]

6.20.3.23 String genex.lib.GenExDefines.TRUE = "true" [static]

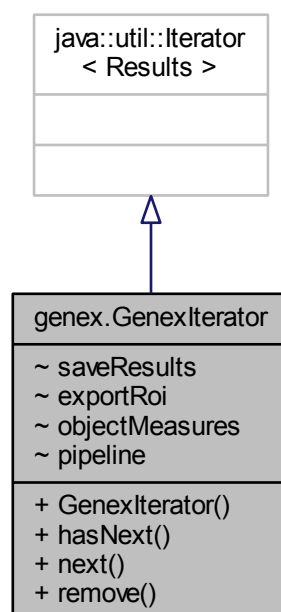
6.20.3.24 String genex.lib.GenExDefines.VALID = "Valid" [static]

The documentation for this class was generated from the following file:

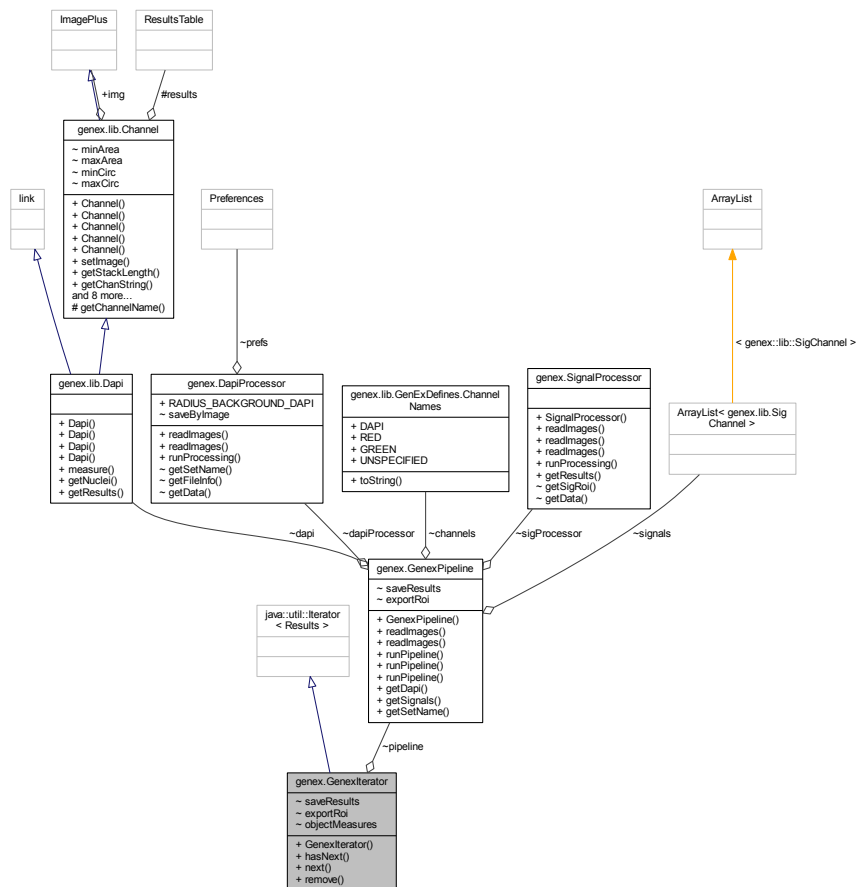
- src/genex/lib/[GenExDefines.java](#)

## 6.21 genex.GenexIterator Class Reference

Inheritance diagram for genex.GenexIterator:



Collaboration diagram for `genex.GenexIterator`:



## Public Member Functions

- `GenexIterator` (int `objectMeasures`, `ChannelNames[]` channels)
- boolean `hasNext` ()
- `Results` `next` ()
- void `remove` ()

## Package Attributes

- final boolean `saveResults` = true
- final boolean `exportRoi` = true
- final int `objectMeasures`
- `GenexPipeline` `pipeline` = null

### 6.21.1 Detailed Description

Author

J. Schier

## 6.21.2 Constructor & Destructor Documentation

6.21.2.1 `genex.GenexIterator.GenexIterator ( int objectMeasures, ChannelNames[] channels )`

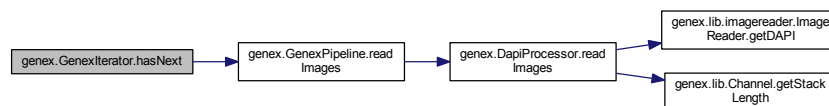
## Parameters

<i>channels</i>	TODO
-----------------	------

### 6.21.3 Member Function Documentation

#### 6.21.3.1 boolean `genex.GenexIterator.hasNext ( )`

Here is the call graph for this function:



#### 6.21.3.2 Results `genex.GenexIterator.next ( )`

Here is the call graph for this function:



#### 6.21.3.3 void `genex.GenexIterator.remove ( )`

### 6.21.4 Member Data Documentation

#### 6.21.4.1 final boolean `genex.GenexIterator.exportRoi = true` [package]

#### 6.21.4.2 final int `genex.GenexIterator.objectMeasures` [package]

#### 6.21.4.3 `GenexPipeline` `genex.GenexIterator.pipeline = null` [package]

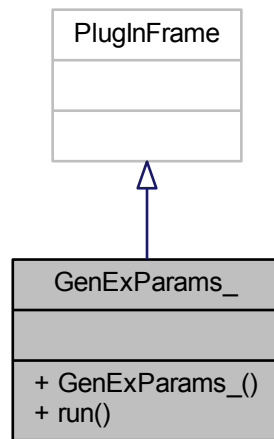
#### 6.21.4.4 final boolean `genex.GenexIterator.saveResults = true` [package]

The documentation for this class was generated from the following file:

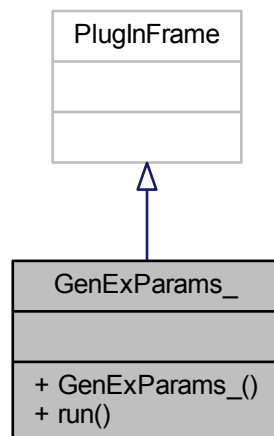
- `src/genex/GenexIterator.java`

## 6.22 GenExParams\_ Class Reference

Inheritance diagram for GenExParams\_:



Collaboration diagram for GenExParams\_:



### Public Member Functions

- [GenExParams\\_\(\)](#)
- void [run](#) (String arg)

### 6.22.1 Detailed Description

ImageJ plugin with GUI dialog for parameter input. The plugin is used to generate data regarding channels (DAP↔I/RED/GREEN) used in the given set, directory of images, file pattern for the given channel

Author

J. Schier

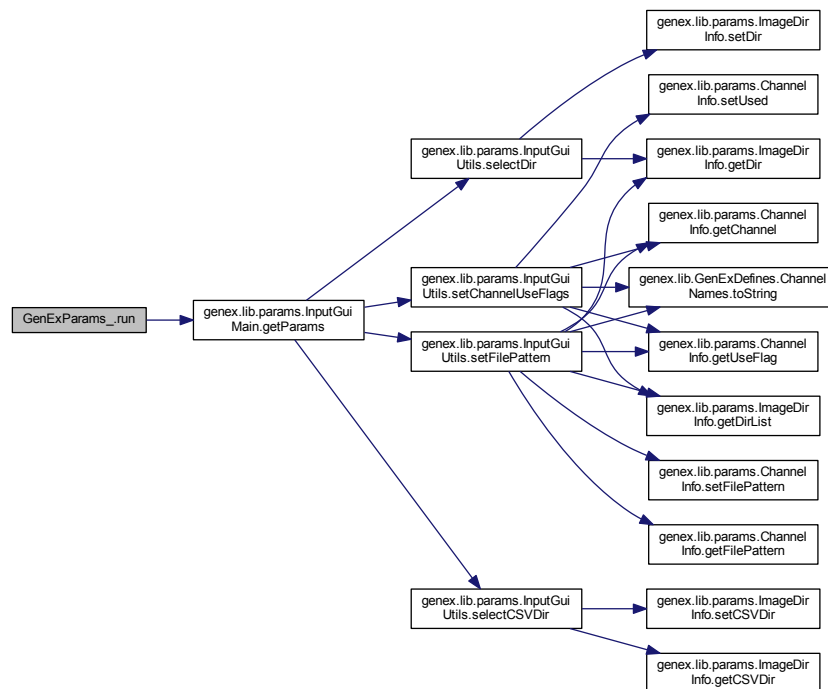
### 6.22.2 Constructor & Destructor Documentation

#### 6.22.2.1 GenExParams\_.GenExParams\_ ( )

### 6.22.3 Member Function Documentation

#### 6.22.3.1 void GenExParams\_.run ( String *arg* )

Here is the call graph for this function:



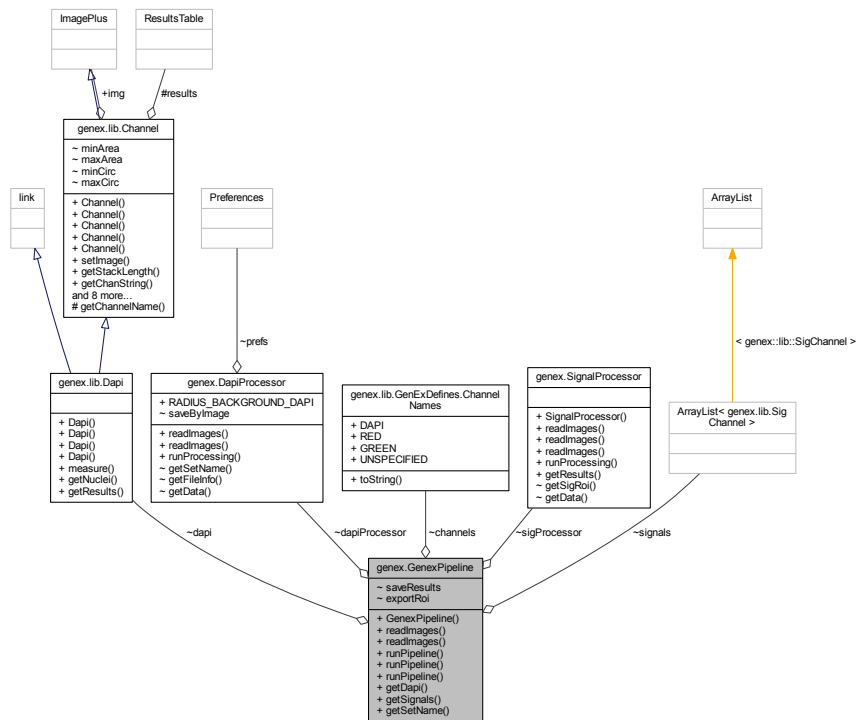
The documentation for this class was generated from the following file:

- [src/GenExParams\\_.java](#)



## 6.23 genex.GenexPipeline Class Reference

Collaboration diagram for genex.GenexPipeline:



### Public Member Functions

- [GenexPipeline](#) ([ChannelNames\[\] channels](#))
- [int readImages](#) ()
- [int readImages](#) ([String fname](#))
- [Results runPipeline](#) ([int objectMeasures](#))
- [Results runPipeline](#) ([ArrayList< String > fname](#), [int objectMeasures](#))
- [Results runPipeline](#) ([String fname](#), [int objectMeasures](#))
- [Dapi getDapi](#) ()
- [ArrayList< SigChannel > getSignals](#) ()
- [String getSetName](#) ()

### Package Attributes

- final boolean [saveResults](#) = true
- final boolean [exportRoi](#) = true
- final [ChannelNames\[\] channels](#)
- [DapiProcessor dapiProcessor](#) = new [DapiProcessor](#)()
- [SignalProcessor sigProcessor](#)
- [ArrayList< SigChannel > signals](#) = null
- [Dapi dapi](#) = null

### 6.23.1 Detailed Description

Author

J. Schier

### 6.23.2 Constructor & Destructor Documentation

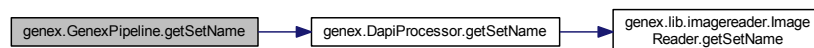
6.23.2.1 `genex.GenexPipeline.GenexPipeline ( ChannelNames[] channels )`

### 6.23.3 Member Function Documentation

6.23.3.1 `Dapi genex.GenexPipeline.getDapi ( )`

6.23.3.2 `String genex.GenexPipeline.getSetName ( )`

Here is the call graph for this function:



6.23.3.3 `ArrayList<SigChannel> genex.GenexPipeline.getSignals ( )`

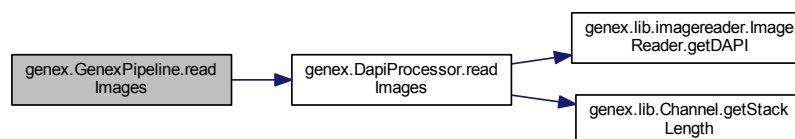
6.23.3.4 `int genex.GenexPipeline.readImages ( )`

Reads one or more dapi images (depends on processByImage setting) into [DapiProcessor](#)

Returns

length of image stack: >0 there are images to process ==0 all images processed -1 reading error

Here is the call graph for this function:



6.23.3.5 `int genex.GenexPipeline.readImages ( String fname )`

Reads image frame into [DapiProcessor](#) processing may continue on subsequent images using [readImages\(\)](#)

**Returns**

length of image stack: >0 there are images to process ==0 all images processed -1 reading error

Here is the call graph for this function:

**6.23.3.6 Results `genex.GenexPipeline.runPipeline ( int objectMeasures )`**

Run image processing pipeline: read all images from input source and process them

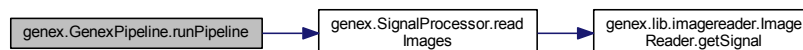
**Parameters**

<i>objectMeasures</i>	object parameters to measure
-----------------------	------------------------------

**Returns**

Results packed Results table and extRois

Here is the call graph for this function:

**6.23.3.7 Results `genex.GenexPipeline.runPipeline ( ArrayList< String > fname, int objectMeasures )`**

Run image processing pipeline: read images denoted by *fname* array and process them (version for individual channel images). Processing may continue on subsequent images if `runPipeline(int objectMeasures)` is used in subsequent calls. *fname* is an array of Strings, one per channel to read

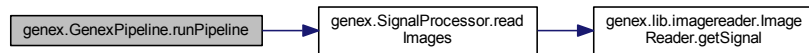
**Parameters**

<i>objectMeasures</i>	object parameters to measure
-----------------------	------------------------------

**Returns**

Results packed Results table and extRois

Here is the call graph for this function:

**6.23.3.8 Results `genex.GenexPipeline.runPipeline ( String fname, int objectMeasures )`**

Run image processing pipeline: read image denoted by fname from input source and process it (version for RGB images). Processing may continue on subsequent images if [runPipeline\(int objectMeasures\)](#) is used in subsequent calls. fname is single String, common for both R and G channel. Which channel to read depends on setting of channels array (initialized in Constructor)

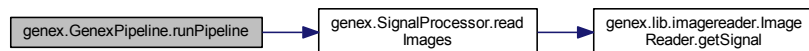
**Parameters**

<i>objectMeasures</i>	object parameters to measure
-----------------------	------------------------------

**Returns**

Results packed Results table and extRois

Here is the call graph for this function:

**6.23.4 Member Data Documentation**

**6.23.4.1** `final ChannelINames [] genex.GenexPipeline.channels` [package]

**6.23.4.2** `Dapi genex.GenexPipeline.dapi = null` [package]

**6.23.4.3** `DapiProcessor genex.GenexPipeline.dapiProcessor = new DapiProcessor()` [package]

**6.23.4.4** `final boolean genex.GenexPipeline.exportRoi = true` [package]

**6.23.4.5** `final boolean genex.GenexPipeline.saveResults = true` [package]

**6.23.4.6** `ArrayList<SigChannel> genex.GenexPipeline.signals = null` [package]

**6.23.4.7** `SignalProcessor genex.GenexPipeline.sigProcessor` [package]

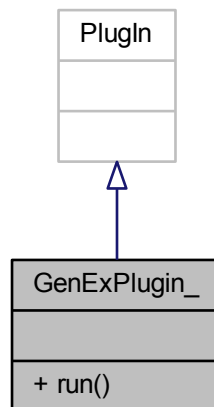
The documentation for this class was generated from the following file:

- `src/genex/GenexPipeline.java`

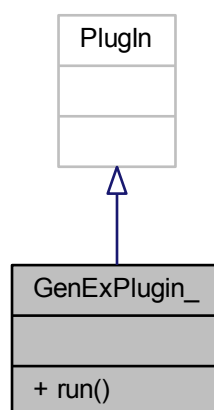
## 6.24 GenExPlugin\_ Class Reference

Plugin entry class.

Inheritance diagram for GenExPlugin\_:



Collaboration diagram for GenExPlugin\_:



### Public Member Functions

- void `run` (String arg)

### 6.24.1 Detailed Description

Plugin entry class.

This plugin contains implementation of image processing methods for FISH microscopy images with centromeric probes for the GenEx project.

It contains methods for denoising, background correction, threshold segmentation, and for object analysis

#### Author

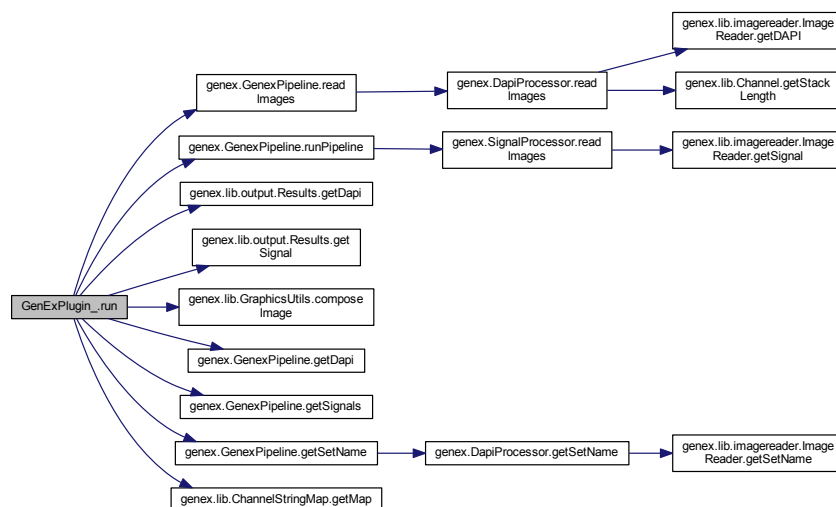
J. Schier, B. Kovář

### 6.24.2 Member Function Documentation

#### 6.24.2.1 void GenExPlugin\_.run ( String arg )

Plugin entry point

Here is the call graph for this function:

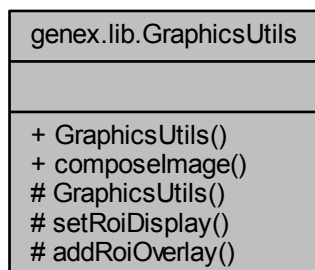


The documentation for this class was generated from the following file:

- [src/GenExPlugin\\_.java](#)

## 6.25 genex.lib.GraphicsUtils Class Reference

Collaboration diagram for genex.lib.GraphicsUtils:



### Public Member Functions

- [GraphicsUtils](#) ()
- ImagePlus [composeImage](#) (final [Dapi](#) dapi, final [ChannelNames](#)[] channels, ArrayList< [SigChannel](#) > signals, String setName)

### Protected Member Functions

- [GraphicsUtils](#) (ArrayList< [ChannelNames](#) > chanNames, ArrayList< Color > colors)
- void [setRoiDisplay](#) ([ExtRoi](#) roi)
- void [addRoiOverlay](#) (ArrayList< [ExtRoi](#) > rois, Overlay overlay)

#### 6.25.1 Detailed Description

Helper utilities for display of detected objects

#### Author

J. Schier

#### 6.25.2 Constructor & Destructor Documentation

6.25.2.1 [genex.lib.GraphicsUtils.GraphicsUtils](#) ( ArrayList< [ChannelNames](#) > *chanNames*, ArrayList< Color > *colors* )  
[protected]

Constructor - defines channel - color mapping using list of channel identifiers and list of colors

#### Parameters

<i>chanNames</i>	channel identifiers
------------------	---------------------

<i>colors</i>	corresponding channel colors
---------------	------------------------------

#### 6.25.2.2 genex.lib.GraphicsUtils.GraphicsUtils ( )

Constructor - defines default channel mapping

### 6.25.3 Member Function Documentation

#### 6.25.3.1 void genex.lib.GraphicsUtils.addRoiOverlay ( ArrayList< ExtRoi > *rois*, Overlay *overlay* ) [protected]

Adds extRoi detected in the given channel to overlay using the corresponding color

Parameters

<i>rois</i>	list of extended ROIs
<i>overlay</i>	image overlay

#### 6.25.3.2 ImagePlus genex.lib.GraphicsUtils.composeImage ( final Dapi *dapi*, final ChannelNames[] *channels*, ArrayList< SigChannel > *signals*, String *setName* )

Compose RGB image out of DAPI channel and signals

Parameters

<i>dapi</i>	dapi channel
<i>channels</i>	channel names (see <a href="#">GenExDefines.ChannelNames</a> )
<i>signals</i>	list of signal channels
<i>setName</i>	name of the input image

Returns

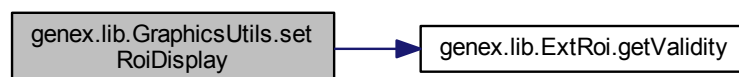
#### 6.25.3.3 void genex.lib.GraphicsUtils.setRoiDisplay ( ExtRoi *roi* ) [protected]

Call methods to set the display parameters for valid/invalid objects

Parameters

<i>roi</i>	object to display
------------	-------------------

Here is the call graph for this function:



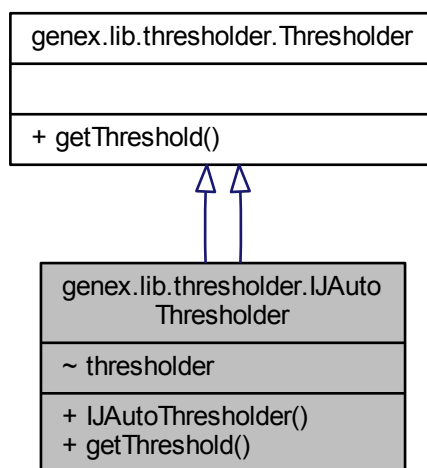
The documentation for this class was generated from the following file:



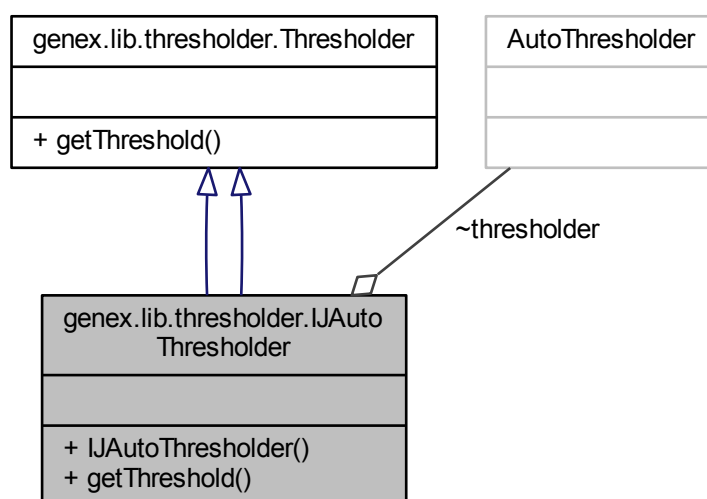
- [src/genex/lib/GraphicsUtils.java](#)

## 6.26 genex.lib.threshold.IJAutoThreshold Class Reference

Inheritance diagram for genex.lib.threshold.IJAutoThreshold:



Collaboration diagram for genex.lib.threshold.IJAutoThreshold:



## Public Member Functions

- [IJAutoThreshold](#) ()
- `int[]` [getThreshold](#) (ImagePlus img)

## Package Attributes

- AutoThreshold [threshold](#) = null

### 6.26.1 Detailed Description

#### Author

J. Schier

### 6.26.2 Constructor & Destructor Documentation

6.26.2.1 `genex.lib.threshold.IJAutoThreshold.IJAutoThreshold ( )`

### 6.26.3 Member Function Documentation

6.26.3.1 `int []` `genex.lib.threshold.IJAutoThreshold.getThreshold ( ImagePlus img )`

get image threshold

#### Parameters

<i>img</i>	input image (contains stack of 1 or more images)
------------	--

#### Returns

array of thresholds

Implements [genex.lib.threshold.Threshold](#).

### 6.26.4 Member Data Documentation

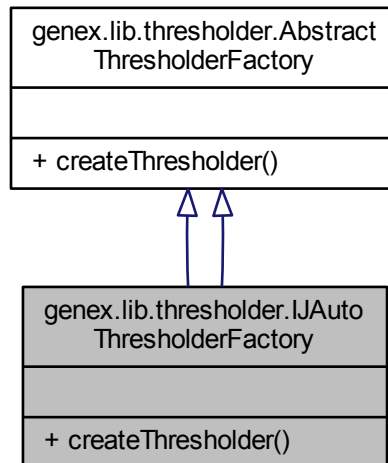
6.26.4.1 AutoThreshold `genex.lib.threshold.IJAutoThreshold.threshold` = null [package]

The documentation for this class was generated from the following file:

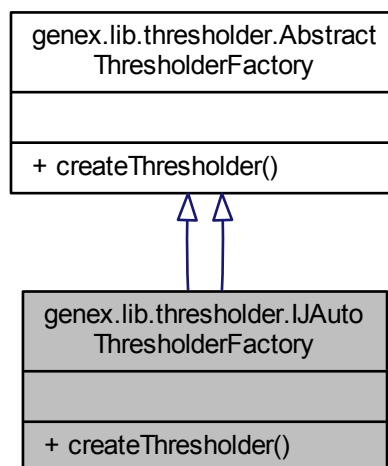
- `src/genex/lib/threshold/IJAutoThreshold.java`
-

## 6.27 genex.lib.threshold.IJAutoThresholderFactory Class Reference

Inheritance diagram for genex.lib.threshold.IJAutoThresholderFactory:



Collaboration diagram for genex.lib.threshold.IJAutoThresholderFactory:



### Public Member Functions

- [Thresholder createThreshold \(\)](#)

### 6.27.1 Detailed Description

ImageJ autothresholder factory

Author

J. Schier

### 6.27.2 Member Function Documentation

#### 6.27.2.1 Thresholder `genex.lib.threshold.IJAutoThresholderFactory.createThresholder ( )`

Create thresholder instance

Returns

[Thresholder](#)

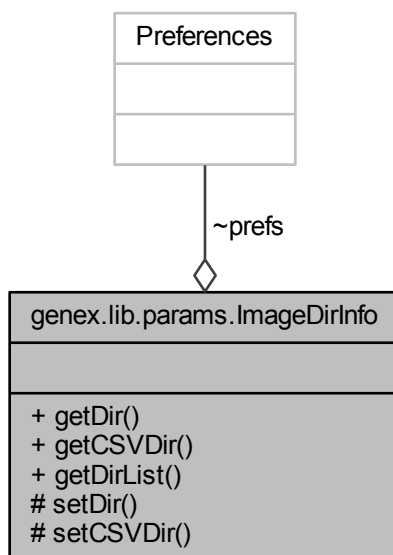
Implements [genex.lib.threshold.AbstractThresholderFactory](#).

The documentation for this class was generated from the following file:

- [src/genex/lib/thresholder/IJAutoThresholderFactory.java](#)

## 6.28 `genex.lib.params.ImageDirInfo` Class Reference

Collaboration diagram for `genex.lib.params.ImageDirInfo`:



### Public Member Functions

- String [getDir \( \)](#)

- String [getCSVDir](#) ()
- File[] [getDirList](#) (String pattern, String dir)

### Protected Member Functions

- void [setDir](#) (String dir)
- void [setCSVDir](#) (String dir)

### Package Attributes

- Preferences [prefs](#) = Preferences.userRoot().node([ParamDefines.PREFS\\_ROOT](#))

## 6.28.1 Detailed Description

Methods to access and store image directory information

#### Author

J. Schier

## 6.28.2 Member Function Documentation

### 6.28.2.1 String `genex.lib.params.ImageDirInfo.getCSVDir ( )`

Get the directory for the CSV result files from Preferences. If not set, use the image directory of the user home directory.

#### Returns

Image directory

### 6.28.2.2 String `genex.lib.params.ImageDirInfo.getDir ( )`

Get last used directory from Preferences. If not set, use the user home directory.

#### Returns

Image directory

### 6.28.2.3 File [] `genex.lib.params.ImageDirInfo.getDirList ( String pattern, String dir )`

Get directory listing conforming given pattern. Only image files with extensions .tif, .tiff, .bmp, .png and .jpg are listed, case insensitive.

#### Parameters

<i>pattern</i>	get filenames containing this pattern. No regex characters (targeted to users who have never heard of regex).
----------------	---

<i>dir</i>	location of image directory
------------	-----------------------------

#### Returns

array of File objects.

#### 6.28.2.4 void genex.lib.params.ImageDirInfo.setCSVDir ( String *dir* ) [protected]

Store CSV directory dir to preferences. Only performed if dir is non-null

##### Parameters

<i>dir</i>	
------------	--

#### 6.28.2.5 void genex.lib.params.ImageDirInfo.setDir ( String *dir* ) [protected]

Store directory dir to preferences. Only performed if dir is non-null

##### Parameters

<i>dir</i>	
------------	--

### 6.28.3 Member Data Documentation

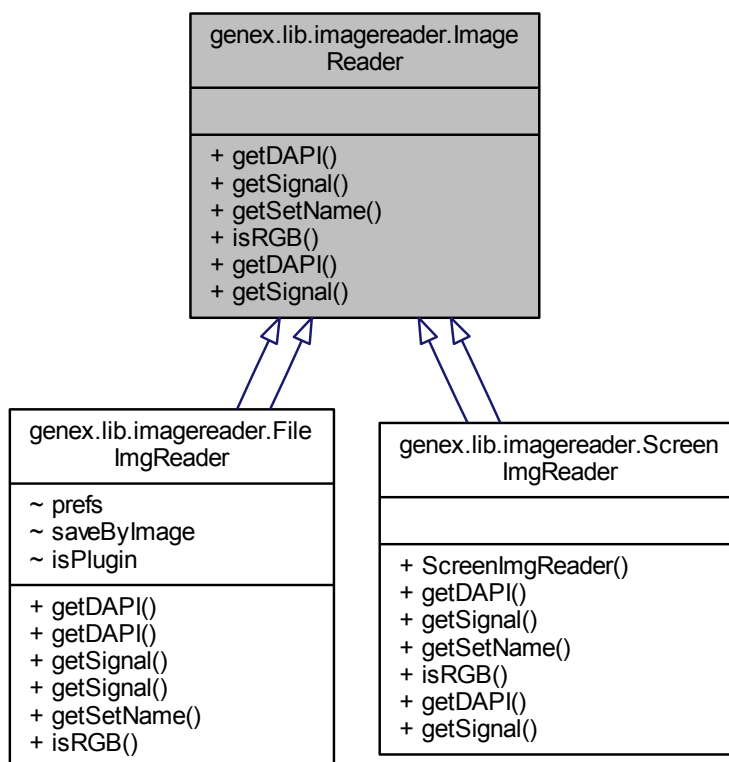
#### 6.28.3.1 Preferences genex.lib.params.ImageDirInfo.prefs = Preferences.userRoot().node(ParamDefines.PREFS\_ROOT) [package]

The documentation for this class was generated from the following file:

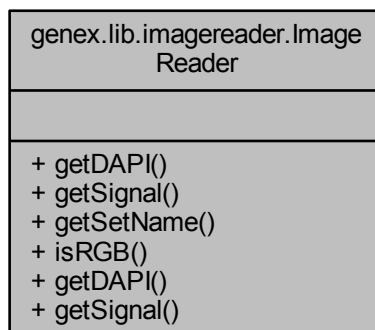
- [src/genex/lib/params/ImageDirInfo.java](#)

## 6.29 genex.lib.imagereader.ImageReader Interface Reference

Inheritance diagram for genex.lib.imagereader.ImageReader:



Collaboration diagram for genex.lib.imagereader.ImageReader:



## Public Member Functions

- abstract [Dapi](#) [getDAPI](#) ()
- abstract [SigChannel](#) [getSignal](#) ([ChannelNames](#) channel)
- abstract String [getSetName](#) ()
- abstract boolean [isRGB](#) ()
- abstract [Dapi](#) [getDAPI](#) (String filename)
- abstract [SigChannel](#) [getSignal](#) (String filename, [ChannelNames](#) channel)

### 6.29.1 Detailed Description

Interface for image reader implementations

Author

J. Schier

### 6.29.2 Member Function Documentation

6.29.2.1 abstract [Dapi](#) [genex.lib.imagereader.ImageReader.getDAPI](#) ( ) [abstract]

Get the DAPI channel

Returns

object containing the DAPI image

Implemented in [genex.lib.imagereader.FileImgReader](#), and [genex.lib.imagereader.ScreenImgReader](#).

6.29.2.2 abstract [Dapi](#) [genex.lib.imagereader.ImageReader.getDAPI](#) ( String *filename* ) [abstract]

Get the DAPI channel Returns null if the filename is not found

Parameters

<i>filename</i>	name of image to read
-----------------	-----------------------

Returns

object containing the DAPI image

Implemented in [genex.lib.imagereader.FileImgReader](#), and [genex.lib.imagereader.ScreenImgReader](#).

6.29.2.3 abstract String [genex.lib.imagereader.ImageReader.getSetName](#) ( ) [abstract]

Get the name of the image set

Returns

set name

Implemented in [genex.lib.imagereader.FileImgReader](#), and [genex.lib.imagereader.ScreenImgReader](#).

6.29.2.4 abstract [SigChannel](#) [genex.lib.imagereader.ImageReader.getSignal](#) ( [ChannelNames](#) *channel* ) [abstract]

Get single signal channel

---



## Parameters

<i>channel</i>	string, denoting the channel: "RED", "GREEN"
----------------	--

## Returns

signal channel

Implemented in [genex.lib.imagereader.FileImgReader](#), and [genex.lib.imagereader.ScreenImgReader](#).

**6.29.2.5** `abstract SigChannel genex.lib.imagereader.ImageReader.getSignal ( String filename, ChannelNames channel )`  
[abstract]

Get single signal channel Returns null if the filename is not found

## Parameters

<i>filename</i>	name of image to read
<i>channel</i>	string, denoting the channel: "RED", "GREEN"

## Returns

signal channel

Implemented in [genex.lib.imagereader.FileImgReader](#), and [genex.lib.imagereader.ScreenImgReader](#).

**6.29.2.6** `abstract boolean genex.lib.imagereader.ImageReader.isRGB ( )` [abstract]

## Returns

true for RGB input images

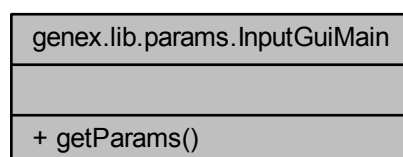
Implemented in [genex.lib.imagereader.FileImgReader](#), and [genex.lib.imagereader.ScreenImgReader](#).

The documentation for this interface was generated from the following file:

- [src/genex/lib/imagereader/ImageReader.java](#)

## 6.30 genex.lib.params.InputGuiMain Class Reference

Collaboration diagram for `genex.lib.params.InputGuiMain`:



## Public Member Functions

- void [getParams](#) ()

### 6.30.1 Detailed Description

Helper class used to set up dialog for input parameters (location of image directory, which channels are used, file pattern for each channel). Parameters are initialized from [ChannelInfo](#) object.

#### Author

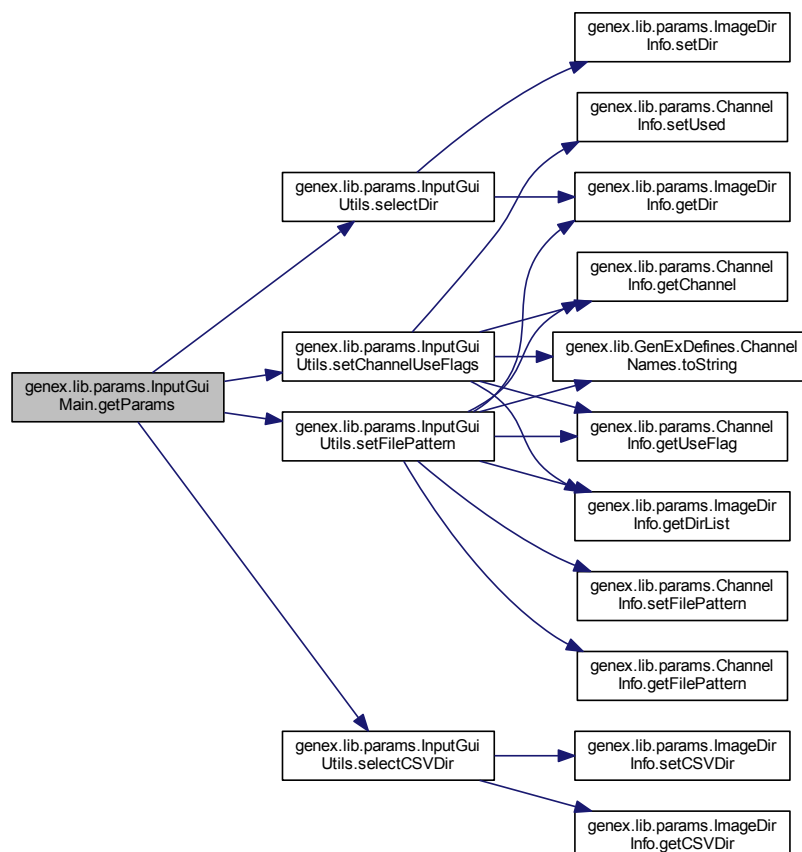
J. Schier

### 6.30.2 Member Function Documentation

#### 6.30.2.1 void [genex.lib.params.InputGuiMain.getParams](#) ( )

Helper method used to create the [ChannelInfo](#) objects for DAPI and signals and to call input dialog methods.

Here is the call graph for this function:

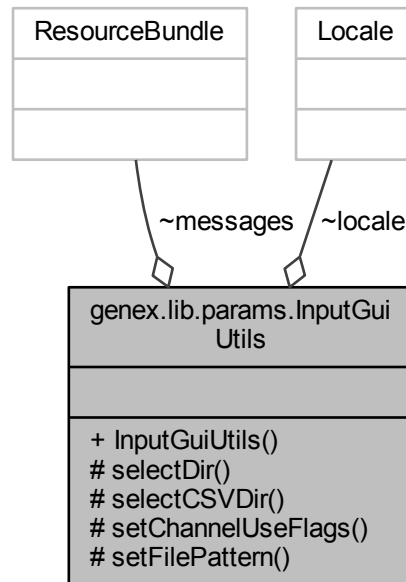


The documentation for this class was generated from the following file:

- [src/genex/lib/params/InputGuiMain.java](#)

## 6.31 genex.lib.params.InputGuiUtils Class Reference

Collaboration diagram for genex.lib.params.InputGuiUtils:



### Public Member Functions

- [InputGuiUtils \(\)](#)

### Protected Member Functions

- String [selectDir \(\)](#)
- String [selectCSVDir \(\)](#)
- Boolean [setChannelUseFlags](#) (ArrayList< [ChannelInfo](#) > channelInfo, String dir)
- void [setFilePattern](#) (ArrayList< [ChannelInfo](#) > channelInfo)

### Package Attributes

- Locale [locale](#)
- ResourceBundle [messages](#)

#### 6.31.1 Detailed Description

GUI for file directory selection

Author

J. Schier

## 6.31.2 Constructor & Destructor Documentation

### 6.31.2.1 `genex.lib.params.InputGuiUtils.InputGuiUtils ( )`

## 6.31.3 Member Function Documentation

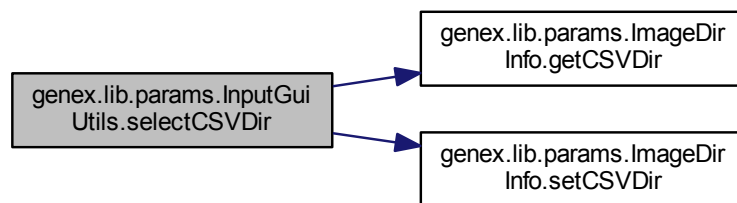
### 6.31.3.1 `String genex.lib.params.InputGuiUtils.selectCSVDir ( )` `[protected]`

Select the directory for storing csv files with results. Defaults to the image directory, if selected, or the home directory if the image directory was not selected yet, or null if cancelled

#### Returns

result directory path

Here is the call graph for this function:



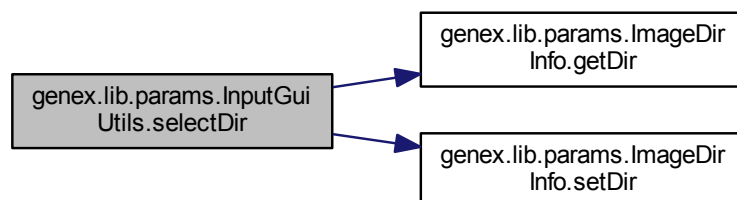
### 6.31.3.2 `String genex.lib.params.InputGuiUtils.selectDir ( )` `[protected]`

Select the image directory. Returns the image directory, or the home directory if the image directory was not selected yet, or null if cancelled

#### Returns

image directory path

Here is the call graph for this function:



6.31.3.3 Boolean `genex.lib.params.InputGuiUtils.setChannelUseFlags ( ArrayList< ChannelInfo > channelInfo, String dir )`  
[protected]

Set channel use flags in the [ChannelInfo](#) records

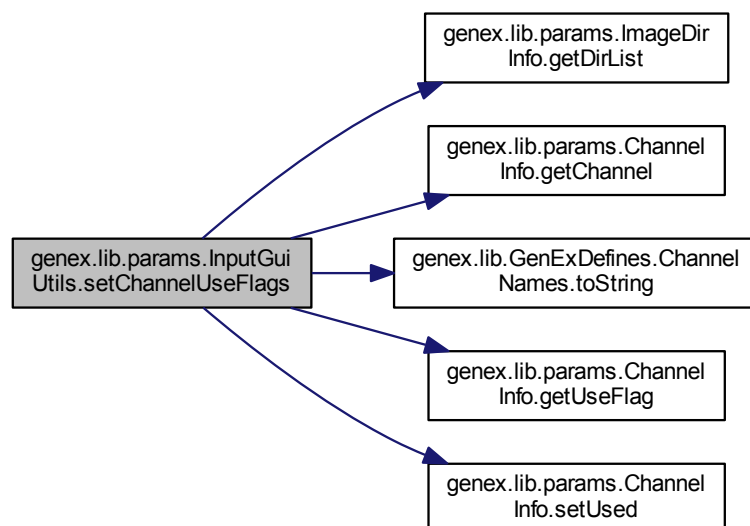
## Parameters

<i>channelInfo</i>	List of <a href="#">Channel</a> information records (see <a href="#">genex.lib.params.ChannelInfo</a> )
<i>dir</i>	image directory

## Returns

return true on successful setting of use flags, false if cancelled.

Here is the call graph for this function:



6.31.3.4 `void genex.lib.params.InputGuiUtils.setFilePattern ( ArrayList< ChannelInfo > channelInfo )` [protected]

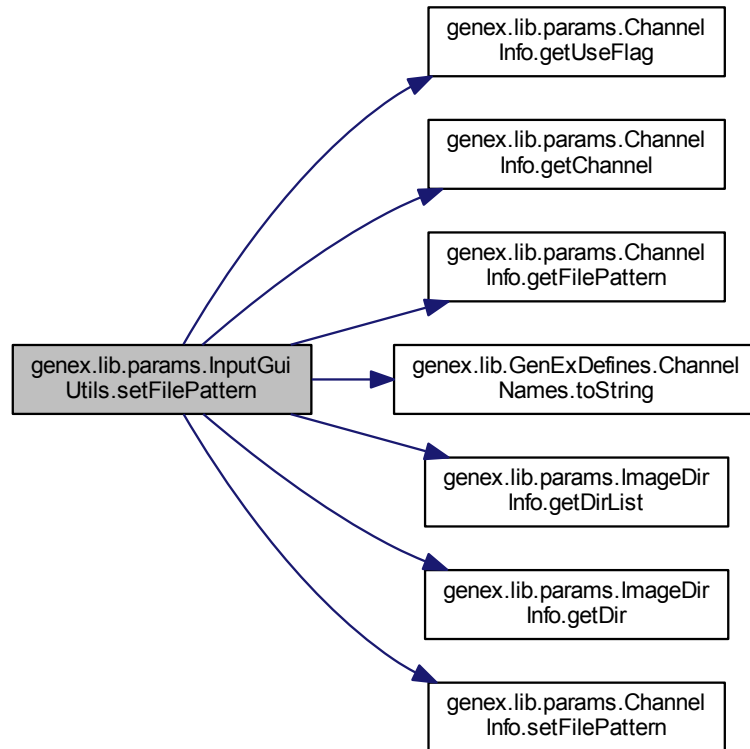
Enter the file pattern common for images in one channel. Checks for illegal characters in input (does not allow regexp characters for simplicity). If an illegal input detected, an error messages is displayed and the dialog GUI is presented again.

Information is stored to the [ChannelInfo](#) object and to java Preferences registers.

## Parameters

<i>channelInfo</i>	Array of <a href="#">ChannelInfo</a> objects
--------------------	--

Here is the call graph for this function:



## 6.31.4 Member Data Documentation

6.31.4.1 Locale `genex.lib.params.InputGuiUtils.locale` [package]

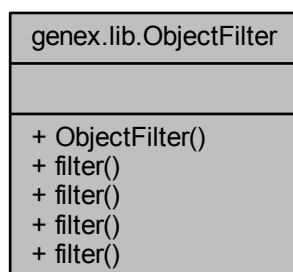
6.31.4.2 ResourceBundle `genex.lib.params.InputGuiUtils.messages` [package]

The documentation for this class was generated from the following file:

- [src/genex/lib/params/InputGuiUtils.java](#)

## 6.32 genex.lib.ObjectFilter Class Reference

Collaboration diagram for genex.lib.ObjectFilter:



### Public Member Functions

- [ObjectFilter](#) (int minArea, int maxArea, double minCirc, double maxCirc)
- boolean [filter](#) (Roi roi, ResultsTable results)
- void [filter](#) ([ExtRoi](#) extRoi, ResultsTable results)
- boolean[] [filter](#) (Roi[] roi, ResultsTable results)
- void [filter](#) (ArrayList< [ExtRoi](#) > rois, ResultsTable results)

### 6.32.1 Detailed Description

Computation of signal statistical parameters, general object filtering

Author

J. Schier, B. Kovář

### 6.32.2 Constructor & Destructor Documentation

6.32.2.1 `genex.lib.ObjectFilter.ObjectFilter ( int minArea, int maxArea, double minCirc, double maxCirc )`

### 6.32.3 Member Function Documentation

6.32.3.1 `boolean genex.lib.ObjectFilter.filter ( Roi roi, ResultsTable results )`

Filter roi by area and circularity, as set by class constructor. The result is stored into the results table, column "Valid", in the row with label corresponding with the roi name and passed as the return value. ImageJ Roi class is used.

Parameters

<i>roi</i>	input roi (see <a href="http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html">http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html</a> )
------------	--



<i>results</i>	results table
----------------	---------------

**Returns**

valid/invalid roi

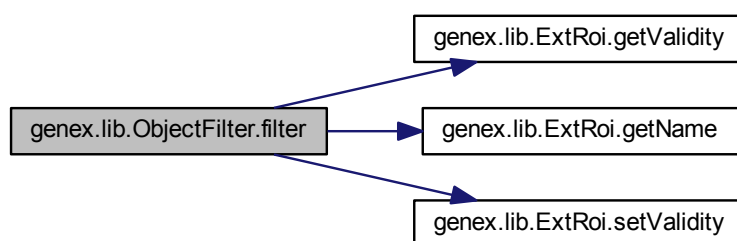
### 6.32.3.2 void genex.lib.ObjectFilter.filter ( ExtRoi *extRoi*, ResultsTable *results* )

Filter [ExtRoi](#) by area and circularity, as set by class constructor. The result (boolean valid{invalid}) is stored into the corresponding [ExtRoi](#) parameter and to the the results table, column "Valid", in the row with label corresponding with the roi name. [ExtRoi](#) class is used.

**Parameters**

<i>extRoi</i>	input roi (see ( <a href="#">ExtRoi</a> ))
<i>results</i>	results table

Here is the call graph for this function:



### 6.32.3.3 boolean [] genex.lib.ObjectFilter.filter ( Roi[] *roi*, ResultsTable *results* )

Filter an array of roi by area and circularity, as set by class constructor. The result is stored into the results table, column "Valid" and passed in the return array. ImageJ Roi class is used.

**Parameters**

<i>roi</i>	input roi (see <a href="http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html">http://imagej.nih.gov/ij/developer/api/ij/gui/Roi.html</a> )
<i>results</i>	results table

**Returns**

valid/invalid roi

### 6.32.3.4 void genex.lib.ObjectFilter.filter ( ArrayList< ExtRoi > *rois*, ResultsTable *results* )

Filter list of [ExtRoi](#) by area and circularity, as set by class constructor. The result (boolean valid{invalid}) is, for each particle, stored into the corresponding [ExtRoi](#) parameter and to the the results table, column "Valid", in the row with label corresponding with the roi name. [ExtRoi](#) class is used.

## Parameters

<i>results</i>	results table
<i>extRoi</i>	input roi (see ( <a href="#">ExtRoi</a> ))

Here is the call graph for this function:

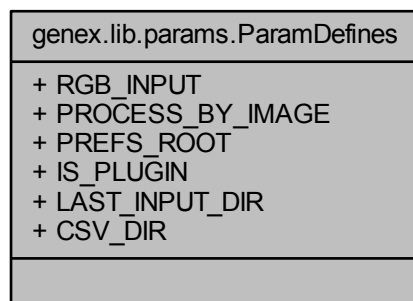


The documentation for this class was generated from the following file:

- [src/genex/lib/ObjectFilter.java](#)

### 6.33 genex.lib.params.ParamDefines Class Reference

Collaboration diagram for genex.lib.params.ParamDefines:



#### Static Public Attributes

- static String [RGB\\_INPUT](#) = "RGB\_INPUT"
- static String [PROCESS\\_BY\\_IMAGE](#) = "SAVE\_BY\_IMAGE"
- static String [PREFS\\_ROOT](#) = "genex"
- static String [IS\\_PLUGIN](#) = "IS\_PLUGIN"
- static String [LAST\\_INPUT\\_DIR](#) = "LAST\_INPUT\_DIR"
- static String [CSV\\_DIR](#) = "CSV\_DIR"

#### 6.33.1 Detailed Description

Parameter definitions shared between genex.param classes and file input

---

Author

J. Schier

### 6.33.2 Member Data Documentation

6.33.2.1 String `genex.lib.params.ParamDefines.CSV_DIR` = "CSV\_DIR" [static]

6.33.2.2 String `genex.lib.params.ParamDefines.IS_PLUGIN` = "IS\_PLUGIN" [static]

6.33.2.3 String `genex.lib.params.ParamDefines.LAST_INPUT_DIR` = "LAST\_INPUT\_DIR" [static]

6.33.2.4 String `genex.lib.params.ParamDefines.PREFS_ROOT` = "genex" [static]

6.33.2.5 String `genex.lib.params.ParamDefines.PROCESS_BY_IMAGE` = "SAVE\_BY\_IMAGE" [static]

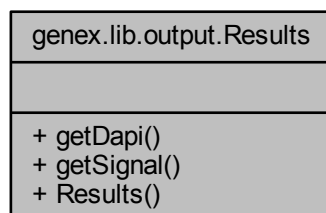
6.33.2.6 String `genex.lib.params.ParamDefines.RGB_INPUT` = "RGB\_INPUT" [static]

The documentation for this class was generated from the following file:

- `src/genex/lib/params/ParamDefines.java`

## 6.34 genex.lib.output.Results Class Reference

Collaboration diagram for `genex.lib.output.Results`:



### Public Member Functions

- [FISHdata](#) `getDapi()`
- [FISHdata](#) `getSignal()`
- [Results](#) ([FISHdata](#) dapi, [FISHdata](#) signal)

### 6.34.1 Detailed Description

Helper class to store complete data for one image

Author

J. Schier

---

### 6.34.2 Constructor & Destructor Documentation

6.34.2.1 `genex.lib.output.Results.Results ( FISHdata dapi, FISHdata signal )`

### 6.34.3 Member Function Documentation

6.34.3.1 `FISHdata genex.lib.output.Results.getDapi ( )`

Returns

the dapi

6.34.3.2 `FISHdata genex.lib.output.Results.getSignal ( )`

Returns

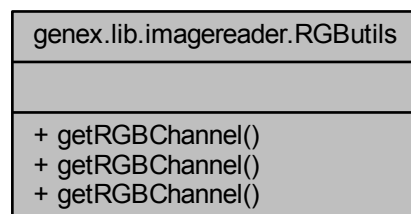
the signal

The documentation for this class was generated from the following file:

- `src/genex/lib/output/Results.java`

## 6.35 `genex.lib.imagereader.RGBUtils` Class Reference

Collaboration diagram for `genex.lib.imagereader.RGBUtils`:



### Public Member Functions

- `ImagePlus` `getRGBChannel` (`ImageStack[]` stack, `String` channelName)
- `ImagePlus` `getRGBChannel` (`ImageStack[]` stack, `GenExDefines.ChannelNames` channel)
- `ImagePlus` `getRGBChannel` (`ImagePlus[]` input, `GenExDefines.ChannelNames` channel)

### 6.35.1 Detailed Description

Utility class for RGB image decomposition

Author

J. Schier, B. Kovář

## 6.35.2 Member Function Documentation

### 6.35.2.1 ImagePlus `genex.lib.imagereader.RGBUtils.getRGBChannel ( ImageStack[] stack, String channelName )`

Implements selection of single channel from the RGB input stack.

#### Parameters

<i>stack</i>	input stack of RGB images
<i>channelName</i>	channel selector ("RED"/"GREEN"/"DAPI"/"BLUE")

#### Returns

selected channel (ImagePlus) or null if the selector is not valid

### 6.35.2.2 ImagePlus `genex.lib.imagereader.RGBUtils.getRGBChannel ( ImageStack[] stack, GenExDefines.ChannelNames channel )`

Implements selection of single channel from the RGB input stack.

#### Parameters

<i>stack</i>	input array of R, G and B stacks
<i>channel</i>	channel selector RED/GREEN/DAPI) (see <a href="#">genex.lib.GenExDefines.ChannelNames</a> )

#### Returns

selected channel (ImagePlus) or null if the selector is not valid

### 6.35.2.3 ImagePlus `genex.lib.imagereader.RGBUtils.getRGBChannel ( ImagePlus[] input, GenExDefines.ChannelNames channel )`

Implements selection of single channel from the RGB input stack.

#### Parameters

<i>input</i>	input array of R, G and B images
<i>channel</i>	channel selector (RED/GREEN/DAPI) (see <a href="#">genex.lib.GenExDefines.ChannelNames</a> )

#### Returns

selected channel (ImagePlus) or null if the selector is not valid

The documentation for this class was generated from the following file:

- `src/genex/lib/imagereader/RGBUtils.java`



## Public Member Functions

- [RoiLabeler](#) (ImagePlus img, [FISHdata dapiData](#), [FISHdata sigData](#), HashMap< [ChannelNames](#), String > [channelStr](#))
- void [mouseClicked](#) (MouseEvent e)
- void [mouseReleased](#) (MouseEvent e)
- void [mouseExited](#) (MouseEvent e)
- void [mouseEntered](#) (MouseEvent e)
- void [mousePressed](#) (MouseEvent e)

## Protected Attributes

- ImagePlus [image](#)
- Overlay [overlay](#)
- ImageCanvas [canvas](#)
- int [slice](#)
- HashMap< String, Integer > [sigs](#) = new HashMap<String, Integer>()
- HashMap< [ChannelNames](#), String > [channelStr](#) = new HashMap<[ChannelNames](#), String>()
- [FISHdata dapiData](#)
- ArrayList< [ExtRoi](#) > [dapiRoi](#)
- int [numSigs](#)
- RoiLimits [dapiSlice2ROIs](#)

## Package Attributes

- [FISHdata sigData](#)
- ArrayList< [ExtRoi](#) > [sigRoi](#)
- RoiLimits [sigSlice2ROIs](#)

### 6.36.1 Detailed Description

This class implements simple interactive editor for labeling the objects (nuclei and signals), detected by the plugin. It is used to correct the valid/invalid setting for the objects, to collect the expert input for evaluation of the system.

#### Author

J. Schier, B. Kovář

### 6.36.2 Constructor & Destructor Documentation

6.36.2.1 `genex.lib.RoiLabeler.RoiLabeler ( ImagePlus img, FISHdata dapiData, FISHdata sigData, HashMap< ChannelNames, String > channelStr )`

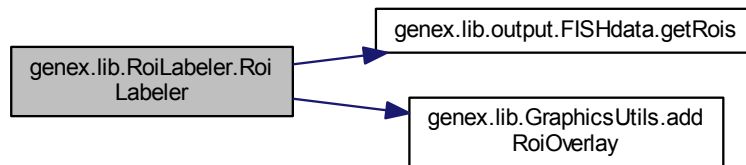
Class constructor for the roi editor

#### Parameters

<i>img</i>	input RGB image
<i>dapiData</i>	data of the DAPI channel, see FISHdata
<i>sigData</i>	data of the signal channels, see FISHdata

<i>channelStr</i>	hash table for conversion between channel identification tags and the corresponding string descriptions ( <a href="#">ChannelStringMap</a> )
-------------------	--

Here is the call graph for this function:



### 6.36.3 Member Function Documentation

#### 6.36.3.1 void genex.lib.RoiLabeler.mouseClicked ( MouseEvent e )

Event listener, implements behavior on mouse click in the image editor

#### 6.36.3.2 void genex.lib.RoiLabeler.mouseEntered ( MouseEvent e )

#### 6.36.3.3 void genex.lib.RoiLabeler.mouseExited ( MouseEvent e )

#### 6.36.3.4 void genex.lib.RoiLabeler.mousePressed ( MouseEvent e )

#### 6.36.3.5 void genex.lib.RoiLabeler.mouseReleased ( MouseEvent e )

### 6.36.4 Member Data Documentation

#### 6.36.4.1 ImageCanvas genex.lib.RoiLabeler.canvas [protected]

#### 6.36.4.2 HashMap<ChannelNames, String> genex.lib.RoiLabeler.channelStr = new HashMap<ChannelNames, String>() [protected]

#### 6.36.4.3 FISHdata genex.lib.RoiLabeler.dapiData [protected]

#### 6.36.4.4 ArrayList<ExtRoi> genex.lib.RoiLabeler.dapiRoi [protected]

#### 6.36.4.5 RoiLimits genex.lib.RoiLabeler.dapiSlice2ROIs [protected]

#### 6.36.4.6 ImagePlus genex.lib.RoiLabeler.image [protected]

#### 6.36.4.7 int genex.lib.RoiLabeler.numSigs [protected]

#### 6.36.4.8 Overlay genex.lib.RoiLabeler.overlay [protected]

#### 6.36.4.9 FISHdata genex.lib.RoiLabeler.sigData [package]

#### 6.36.4.10 ArrayList<ExtRoi> genex.lib.RoiLabeler.sigRoi [package]



6.36.4.11 `HashMap<String, Integer> genex.lib.RoiLabeler.sigs = new HashMap<String, Integer>()` [protected]

6.36.4.12 `RoiLimits genex.lib.RoiLabeler.sigSlice2ROIs` [package]

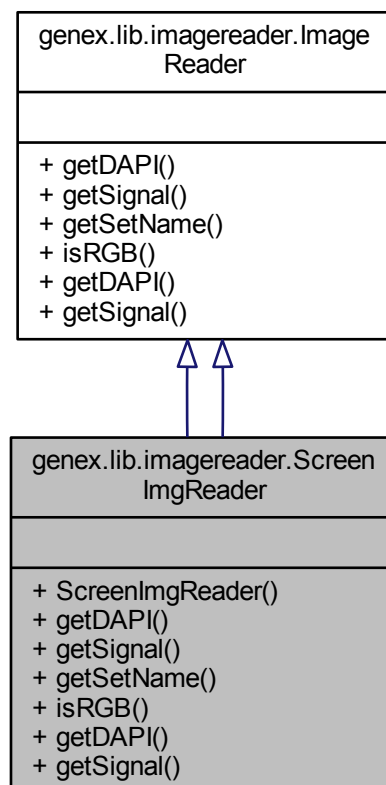
6.36.4.13 `int genex.lib.RoiLabeler.slice` [protected]

The documentation for this class was generated from the following file:

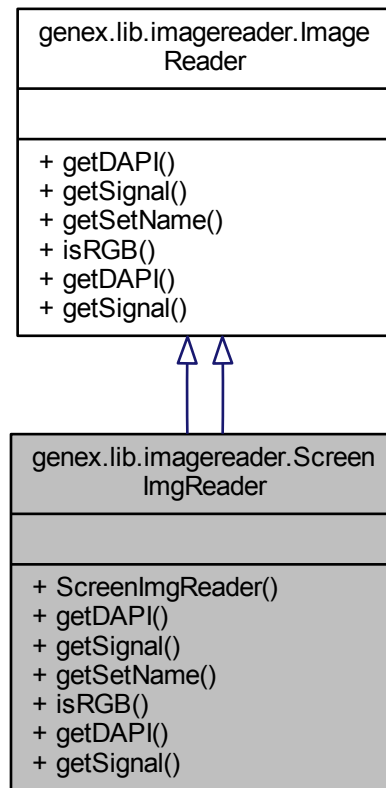
- `src/genex/lib/RoiLabeler.java`

## 6.37 genex.lib.imagereader.ScreenImgReader Class Reference

Inheritance diagram for `genex.lib.imagereader.ScreenImgReader`:



Collaboration diagram for `genex.lib.imagereader.ScreenImgReader`:



## Public Member Functions

- [ScreenImgReader \(\)](#)
- [Dapi getDAPI \(\)](#)
- [SigChannel getSignal \(ChannelNames channel\)](#)
- [String getSetName \(\)](#)
- [boolean isRGB \(\)](#)
- [Dapi getDAPI \(String filename\)](#)
- [SigChannel getSignal \(String filename, ChannelNames channel\)](#)

### 6.37.1 Detailed Description

Methods for reading the input image from the screen.

Author

J. Schier

### 6.37.2 Constructor & Destructor Documentation

6.37.2.1 `genex.lib.imagereader.ScreenImgReader.ScreenImgReader ( )`

Creates a reader instance.

## 6.37.3 Member Function Documentation

6.37.3.1 `Dapi genex.lib.imagereader.ScreenImgReader.getDapi ( )`

Get the DAPI channel

## Returns

object containing the DAPI image

Implements [genex.lib.imagereader.ImageReader](#).

6.37.3.2 `Dapi genex.lib.imagereader.ScreenImgReader.getDapi ( String filename )`

Get the DAPI channel Returns null if the filename is not found

## Parameters

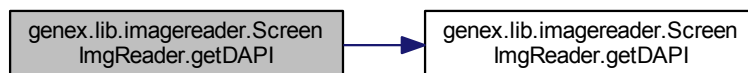
<i>filename</i>	name of image to read
-----------------	-----------------------

## Returns

object containing the DAPI image

Implements [genex.lib.imagereader.ImageReader](#).

Here is the call graph for this function:

6.37.3.3 `String genex.lib.imagereader.ScreenImgReader.getSetName ( )`

Get the name of the image set

## Returns

set name

Implements [genex.lib.imagereader.ImageReader](#).

6.37.3.4 `SigChannel genex.lib.imagereader.ScreenImgReader.getSignal ( ChannelNames channel )`

Get single signal channel

## Parameters

<i>channel</i>	string, denoting the channel: "RED", "GREEN"
----------------	--

## Returns

signal channel

Implements [genex.lib.imagereader.ImageReader](#).

### 6.37.3.5 SigChannel `genex.lib.imagereader.ScreenImgReader.getSignal ( String filename, ChannelNames channel )`

Get single signal channel Returns null if the filename is not found

## Parameters

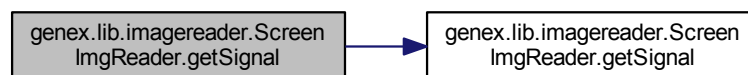
<i>filename</i>	name of image to read
<i>channel</i>	string, denoting the channel: "RED", "GREEN"

## Returns

signal channel

Implements [genex.lib.imagereader.ImageReader](#).

Here is the call graph for this function:



### 6.37.3.6 `boolean genex.lib.imagereader.ScreenImgReader.isRGB ( )`

## Returns

true for RGB input images

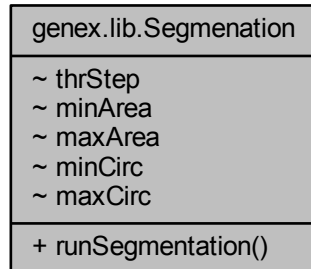
Implements [genex.lib.imagereader.ImageReader](#).

The documentation for this class was generated from the following file:

- `src/genex/lib/imagereader/ScreenImgReader.java`

## 6.38 genex.lib.Segmenation Class Reference

Collaboration diagram for genex.lib.Segmenation:



### Public Member Functions

- ImagePlus [runSegmentation](#) (ImagePlus img, boolean watershed)

### Package Attributes

- final int [thrStep](#) = 3
- final int [minArea](#) = 500
- final int [maxArea](#) = 90000
- final double [minCirc](#) = .7
- final double [maxCirc](#) = 1.0

### 6.38.1 Detailed Description

Author

J. Schier

### 6.38.2 Member Function Documentation

#### 6.38.2.1 ImagePlus genex.lib.Segmenation.runSegmentation ( ImagePlus *img*, boolean *watershed* )

Perform segmentation of an image, optionally perform watershed segmentation on the result

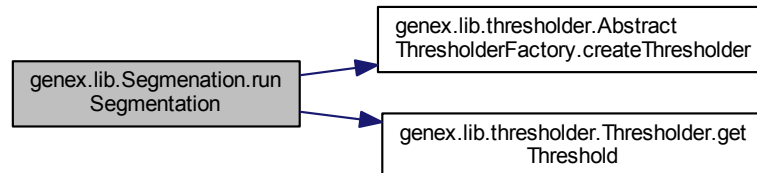
Parameters

<i>img</i>	input image
<i>watershed</i>	perform watershed segmentation

**Returns**

resulting binary image

Here is the call graph for this function:

**6.38.3 Member Data Documentation**

6.38.3.1 `final int genex.lib.Segmentation.maxArea = 90000` [package]

6.38.3.2 `final double genex.lib.Segmentation.maxCirc = 1.0` [package]

6.38.3.3 `final int genex.lib.Segmentation.minArea = 500` [package]

6.38.3.4 `final double genex.lib.Segmentation.minCirc = .7` [package]

6.38.3.5 `final int genex.lib.Segmentation.thrStep = 3` [package]

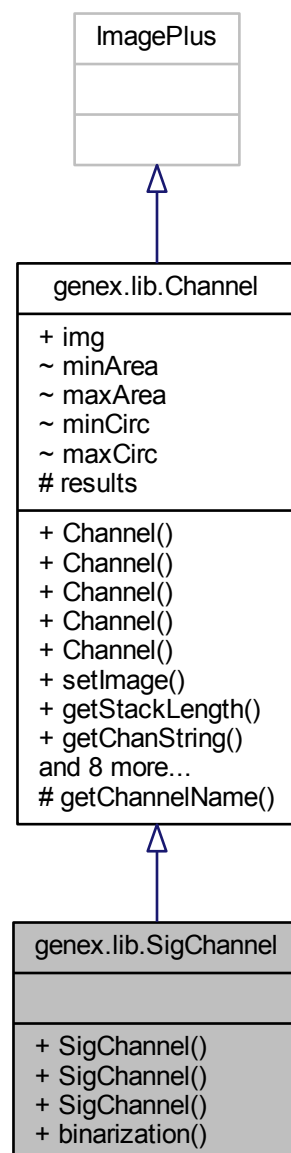
The documentation for this class was generated from the following file:

- `src/genex/lib/Segmenation.java`

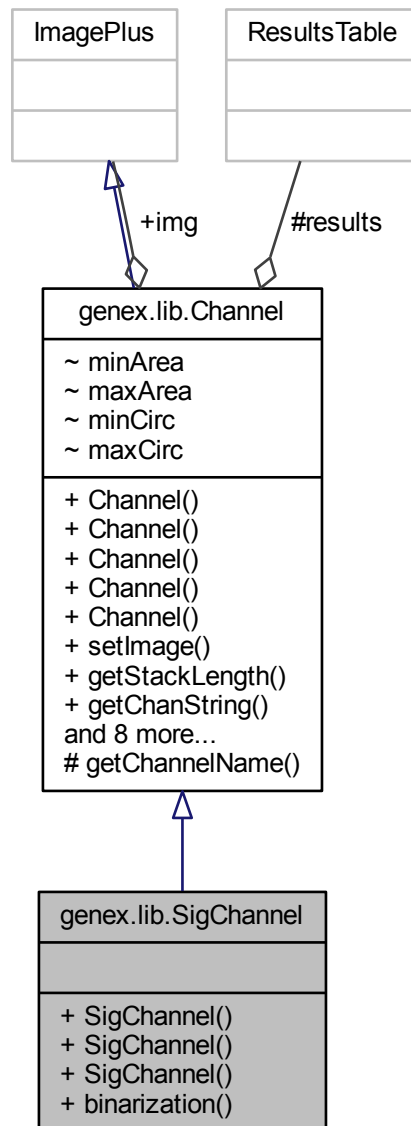
**6.39 genex.lib.SigChannel Class Reference**

Channel-specific methods for hybridization signals, extends the [Channel](#) class.

Inheritance diagram for genex.lib.SigChannel:



Collaboration diagram for `genex.lib.SigChannel`:



### Public Member Functions

- [SigChannel](#) (`ImageStack[] stack`, `String channel`)
- [SigChannel](#) (`ImageStack[] stack`, [ChannelNames](#) `channel`)
- [SigChannel](#) (`ImagePlus image`, [ChannelNames](#) `channel`)
- void [binarization](#) ()

### Additional Inherited Members



### 6.39.1 Detailed Description

Channel-specific methods for hybridization signals, extends the [Channel](#) class.

Author

J. Schier, B. Kovář

### 6.39.2 Constructor & Destructor Documentation

#### 6.39.2.1 `genex.lib.SigChannel.SigChannel ( ImageStack[] stack, String channel )`

Selects channel from the input RGB stack.

Parameters

<i>stack</i>	input RGB stack
<i>channel</i>	"RED"/"GREEN"/"BLUE" String denoting color of the selected channel

#### 6.39.2.2 `genex.lib.SigChannel.SigChannel ( ImageStack[] stack, ChannelNames channel )`

Selects channel from the input RGB stack.

Parameters

<i>stack</i>	input RGB stack
<i>channel</i>	RED/GREEN/DAPI identifier of the selected channel <a href="#">GenExDefines.ChannelNames</a>

#### 6.39.2.3 `genex.lib.SigChannel.SigChannel ( ImagePlus image, ChannelNames channel )`

Constructs signal channel from the input image stack.

Parameters

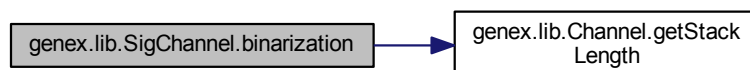
<i>stack</i>	input image stack
<i>channel</i>	RED/GREEN/DAPI identifier of the selected channel <a href="#">GenExDefines.ChannelNames</a>

### 6.39.3 Member Function Documentation

#### 6.39.3.1 `void genex.lib.SigChannel.binarization ( )`

Binarization of hybridization signals. Uses threshold segmentation by Renyi Entropy method

Here is the call graph for this function:

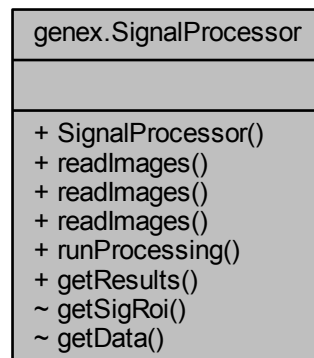


The documentation for this class was generated from the following file:

- [src/genex/lib/SigChannel.java](#)

## 6.40 genex.SignalProcessor Class Reference

Collaboration diagram for genex.SignalProcessor:



### Public Member Functions

- `SignalProcessor` (`ChannelNames[]` channels)
- `int readImages` ()
- `int readImages` (`ArrayList< String >` fname)
- `int readImages` (`String` fname)
- `ArrayList< SigChannel >` `runProcessing` (`ChannelNames[]` channels, `ArrayList< ExtRoi >` nuclei, `int` object↔  
Measures, `boolean` saveResults, `boolean` exportRoi)
- `ResultsTable` `getResults` ()

### Package Functions

- `ArrayList< ExtRoi >` `getSigRoi` ()
- `FISHdata` `getData` ()

#### 6.40.1 Detailed Description

This class is used to define the processing flow for the signal channels (RED, GREEN), that is, to call the processing methods from the GenEx library.

#### Author

J. Schier, B. Kovář

## 6.40.2 Constructor & Destructor Documentation

### 6.40.2.1 genex.SignalProcessor.SignalProcessor ( ChannelNames[] *channels* )

Constructor - initialize an array of imageReaders, one for each signal channel

## Parameters

<i>channels</i>	
-----------------	--

## 6.40.3 Member Function Documentation

6.40.3.1 **FISHdata** `genex.SignalProcessor.getData ( )` [package]

6.40.3.2 **ResultsTable** `genex.SignalProcessor.getResults ( )`

## Returns

signals result table <http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html>

6.40.3.3 **ArrayList<ExtRoi>** `genex.SignalProcessor.getSigRoi ( )` [package]

## Returns

signal extRois ExtRoi

6.40.3.4 **int** `genex.SignalProcessor.readImages ( )`

Get input images for signals

## Returns

error code: 0=OK, -1= error reading file

Here is the call graph for this function:



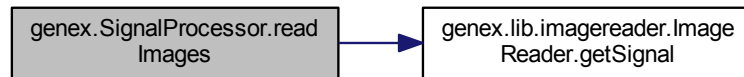
6.40.3.5 **int** `genex.SignalProcessor.readImages ( ArrayList<String> fname )`

Get input images for signals from fname (version for one image per channel) fname should contain one String per each channel to read.

**Returns**

error code: 0=OK, -1=wrong frame or error reading file

Here is the call graph for this function:



#### 6.40.3.6 int genex.SignalProcessor.readImages ( String *fname* )

Get input images for signals from *fname* (version for RGB images) *fname* contains common filename for both R and G channel.

**Returns**

error code: 0=OK, -1=wrong frame or error reading file

Here is the call graph for this function:



#### 6.40.3.7 ArrayList<SigChannel> genex.SignalProcessor.runProcessing ( ChannelNames[] *channels*, ArrayList<ExtRoi> *nuclei*, int *objectMeasures*, boolean *saveResults*, boolean *exportRoi* )

This method defines the processing flow of the signal channels

**Parameters**

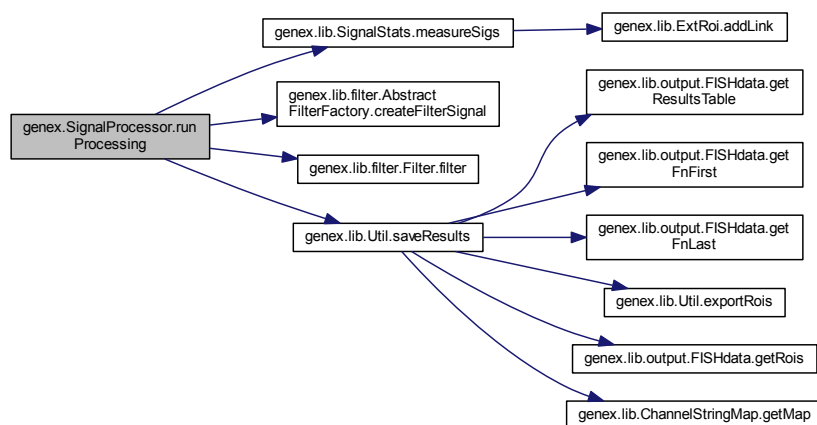
<i>channels</i>	Array of ChannelNames GenExDefines.ChannelNames identifiers, define the channels that are actually used (mainly for the case of RGB input, with only one of the R/G channels used)
<i>nuclei</i>	list of ExtRoi ExtRoi, defining the nuclei (objects) found in the DAPI channel
<i>objectMeasures</i>	object parameters to be measured <a href="http://imagej.nih.gov/ij/developer/api/ij/measure/Measurements.html">http://imagej.nih.gov/ij/developer/api/ij/measure/Measurements.html</a>
<i>saveResults</i>	boolean: save the results table <a href="http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html">http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html</a> to a file

<i>exportRoi</i>	boolean: export ROI <a href="http://imagej.nih.gov/ij/developer/api/ij/gui/PolygonRoi.html">http://imagej.nih.gov/ij/developer/api/ij/gui/PolygonRoi.html</a> to a file
------------------	---

### Returns

list of signal channels Channel

Here is the call graph for this function:

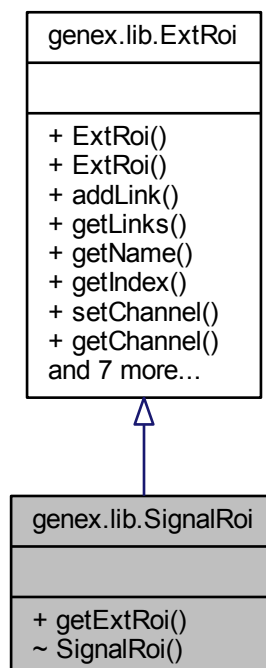


The documentation for this class was generated from the following file:

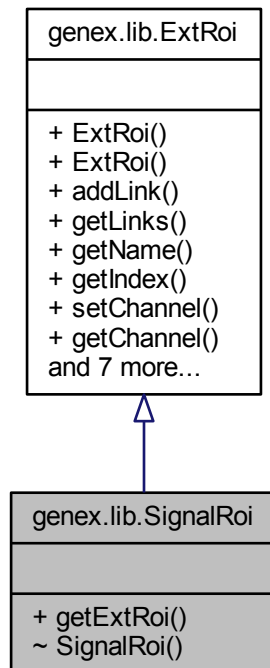
- [src/genex/SignalProcessor.java](#)

## 6.41 genex.lib.SignalRoi Class Reference

Inheritance diagram for genex.lib.SignalRoi:



Collaboration diagram for `genex.lib.SignalRoi`:



## Public Member Functions

- [ExtRoi](#) `getExtRoi ()`

## Package Functions

- [SignalRoi](#) (`Roi signal`, [ExtRoi](#) `extRoi`, [ChannelNames](#) `channel`, `int idx`)

### 6.41.1 Detailed Description

Signal, detected in nucleus

Author

J. Schier

### 6.41.2 Constructor & Destructor Documentation

6.41.2.1 `genex.lib.SignalRoi.SignalRoi ( Roi signal, ExtRoi extRoi, ChannelNames channel, int idx )` [`package`]

### 6.41.3 Member Function Documentation



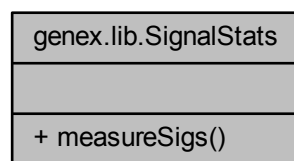
## 6.41.3.1 ExtRoi genex.lib.SignalRoi.getExtRoi ( )

The documentation for this class was generated from the following file:

- src/genex/lib/[SignalRoi.java](#)

## 6.42 genex.lib.SignalStats Class Reference

Collaboration diagram for genex.lib.SignalStats:



## Public Member Functions

- ResultsTable [measureSigs](#) (ArrayList< [SigChannel](#) > images, ArrayList< [ExtRoi](#) > nuclei, ArrayList< [ExtRoi](#) > signals, int measures, int minSize, int maxSize)

## 6.42.1 Member Function Documentation

6.42.1.1 ResultsTable genex.lib.SignalStats.measureSigs ( ArrayList< [SigChannel](#) > *images*, ArrayList< [ExtRoi](#) > *nuclei*, ArrayList< [ExtRoi](#) > *signals*, int *measures*, int *minSize*, int *maxSize* )

Measure signals: the binary image of signals, as received from segmentation, is masked by DAPI nuclei (roi). For the signals contained in each nucleus, parameters, as defined by measures, are evaluated. For definition of parameters, see <http://imagej.nih.gov/ij/docs/guide/146-30.html#sub:Set-Measurements...> and <http://imagej.nih.gov/ij/developer/api/ij/measure/ResultsTable.html>. The resulting data is stored in the sigResults ResultsTable. Signals are filtered by minSize and maxSize.

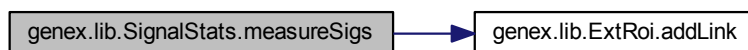
## Parameters

<i>images</i>	input images of signals, list of image stacks. Arbitrary number of channels may be passed, each with a stack of images.
<i>nuclei</i>	list of nuclei, stored in extended rois ( <a href="#">ExtRoi</a> )
<i>signals</i>	list of signal rois, stored in extended rois
<i>measures</i>	parameter definition
<i>minSize</i>	minimum particle size in pixels
<i>maxSize</i>	maximum particle size in pixels

**Returns**

result table

Here is the call graph for this function:



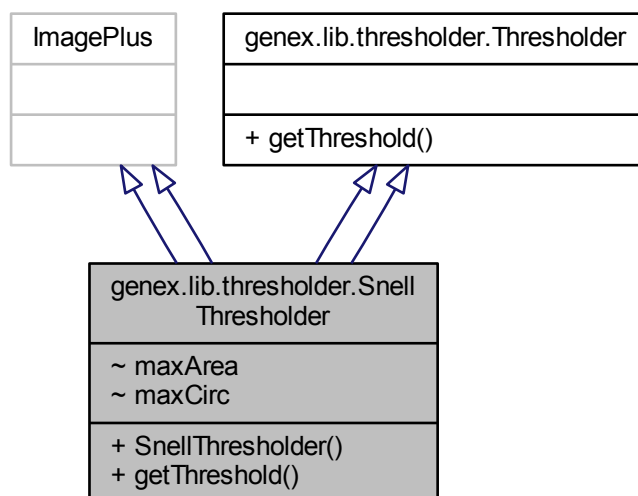
The documentation for this class was generated from the following file:

- [src/genex/lib/SignalStats.java](#)

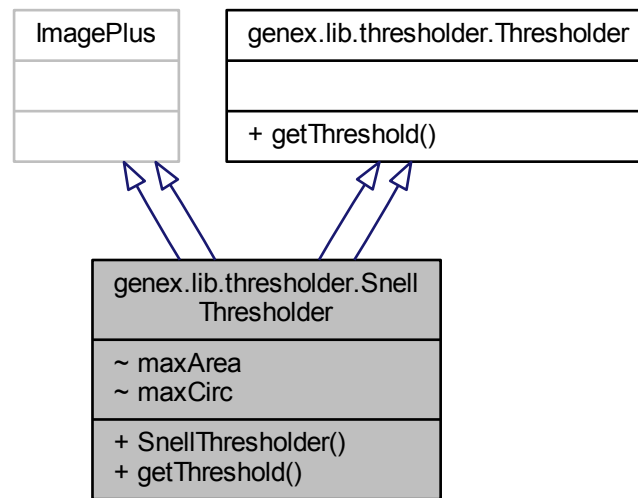
## 6.43 genex.lib.threshold.SnellThresholder Class Reference

Implementation of Violet Snell segmentation.

Inheritance diagram for genex.lib.threshold.SnellThresholder:



Collaboration diagram for genex.lib.threshold.SnellThresholder:



## Public Member Functions

- [SnellThresholder](#) (int minArea, int [maxArea](#), double minCirc, double [maxCirc](#), int minThr, int thrStep, boolean stack)
- int[] [getThreshold](#) (ImagePlus img)

## Package Attributes

- final int [maxArea](#)
- final double [maxCirc](#)

### 6.43.1 Detailed Description

Implementation of Violet Snell segmentation.

Author

J. Schier

### 6.43.2 Constructor & Destructor Documentation

- 6.43.2.1 `genex.lib.threshold.SnellThresholder.SnellThresholder ( int minArea, int maxArea, double minCirc, double maxCirc, int minThr, int thrStep, boolean stack )`

Segmentation by the Violet Snell method.

## Parameters

<i>minArea</i>	minimum area of detected objects
<i>maxArea</i>	maximum area of detected objects
<i>minCirc</i>	minimum circularity of detected objects
<i>maxCirc</i>	maximum circularity of detected objects
<i>minThr</i>	minimum allowed threshold to use (user input)
<i>thrStep</i>	threshold decrease step

## See also

Snell et al: Segmentation and shape classification of nuclei, Centre for Vision, Signal Processing and Speech, University of Surrey

## 6.43.3 Member Function Documentation

6.43.3.1 `int [] genex.lib.threshold.SnellThresholder.getThreshold ( ImagePlus img )`

Segmentation by the Violet Snell method. Run the computation.

## Parameters

<i>img</i>	input stack of 8-bit grayscale images
------------	---------------------------------------

Implements [genex.lib.threshold.Thresholder](#).

## 6.43.4 Member Data Documentation

6.43.4.1 `final int genex.lib.threshold.SnellThresholder.maxArea` [package]

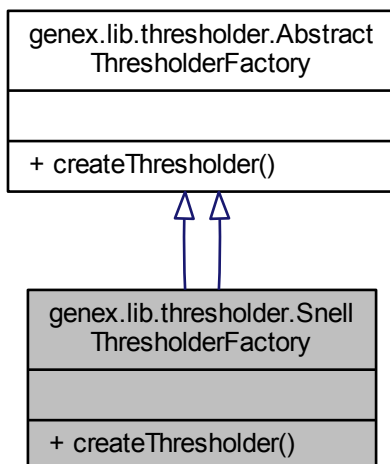
6.43.4.2 `final double genex.lib.threshold.SnellThresholder.maxCirc` [package]

The documentation for this class was generated from the following file:

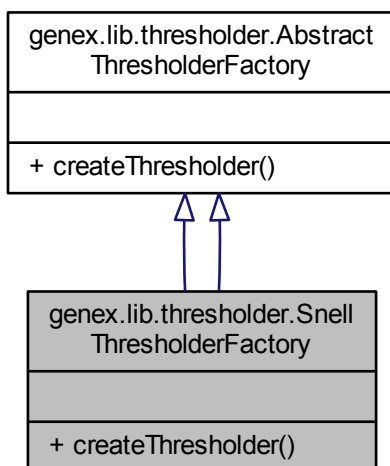
- `src/genex/lib/thresholder/SnellThresholder.java`

## 6.44 genex.lib.threshold.SnellThresholderFactory Class Reference

Inheritance diagram for genex.lib.threshold.SnellThresholderFactory:



Collaboration diagram for genex.lib.threshold.SnellThresholderFactory:



### Public Member Functions

- [Thresholder createThreshold \(\)](#)

### 6.44.1 Detailed Description

Snell thresholder factory

Author

J. Schier

### 6.44.2 Member Function Documentation

#### 6.44.2.1 Thresholder `genex.lib.threshold.SnellThresholderFactory.createThresholder ( )`

Create thresholder instance

Returns

[Thresholder](#)

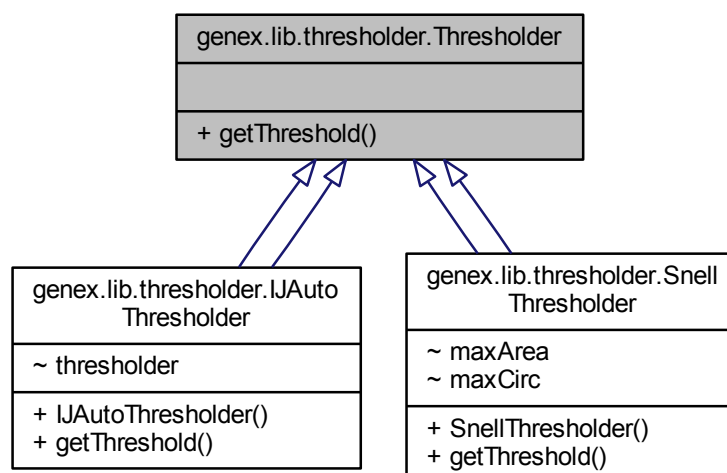
Implements [genex.lib.threshold.AbstractThresholderFactory](#).

The documentation for this class was generated from the following file:

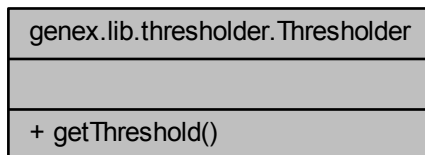
- `src/genex/lib/thresholder/SnellThresholderFactory.java`

## 6.45 `genex.lib.threshold.Thresholder` Interface Reference

Inheritance diagram for `genex.lib.threshold.Thresholder`:



Collaboration diagram for genex.lib.threshold.Threshold:



## Public Member Functions

- `int[] getThreshold (ImagePlus img)`

### 6.45.1 Detailed Description

Author

J. Schier

### 6.45.2 Member Function Documentation

6.45.2.1 `int [] genex.lib.threshold.Threshold.getThreshold ( ImagePlus img )`

get image threshold

Parameters

<i>img</i>	input image (contains stack of 1 or more images)
------------	--

**Returns**

array of thresholds

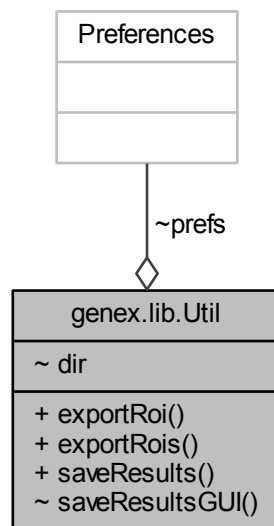
Implemented in [genex.lib.threshold.SnellThresholder](#), and [genex.lib.threshold.IJAutoThresholder](#).

The documentation for this interface was generated from the following file:

- [src/genex/lib/thresholder/Thresholder.java](#)

## 6.46 genex.lib.Util Class Reference

Collaboration diagram for genex.lib.Util:



### Public Member Functions

- void [exportRoi](#) ([ExtRoi](#) extRoi, String channel, [BufferedWriter](#) writer)
- void [exportRois](#) ([ArrayList](#)< [ExtRoi](#) > rois, [HashMap](#)< [ChannelNames](#), String > channelMap, String filename)
- void [saveResults](#) ([FISHdata](#) data, String descriptor, Boolean exportRoi)

### Package Functions

- void [saveResultsGUI](#) ([FISHdata](#) dapiData, [FISHdata](#) sigData)

### Package Attributes

- final [Preferences](#) [prefs](#) = [Preferences](#).userRoot().node([ParamDefines](#).[PREFS\\_ROOT](#))
- String [dir](#) = [prefs](#).get([ParamDefines](#).[CSV\\_DIR](#), [prefs](#).get([ParamDefines](#).[LAST\\_INPUT\\_DIR](#), ""))



### 6.46.1 Detailed Description

Helper methods for saving object parameters and ROIs to disk files

Author

J. Schier, B. Kovář

### 6.46.2 Member Function Documentation

#### 6.46.2.1 void genex.lib.Util.exportRoi ( ExtRoi extRoi, String channel, BufferedWriter writer )

Export rois to a text file. Takes extended rois and extracts the coordinates of the polygon rois <http://imagej.nih.gov/ij/developer/api/ij/gui/PolygonRoi.html>

Each record in the text file consists of the roi name, roi id number, channel name (String), number of vertices, and their x and y coordinates in format x1, y1, x2, y2, ..

Parameters

<i>extRoi</i>	input extended rois <a href="#">ExtRoi</a>
<i>channel</i>	channel identification string
<i>writer</i>	file writer

Here is the call graph for this function:



#### 6.46.2.2 void genex.lib.Util.exportRois ( ArrayList< ExtRoi > rois, HashMap< ChannelNames, String > channelMap, String filename )

Export rois to a text file. Takes extended rois and extracts the coordinates of the polygon rois <http://imagej.nih.gov/ij/developer/api/ij/gui/PolygonRoi.html>

Each record in the text file consists of the roi name, roi id number, channel name, number of vertices, and their x and y coordinates in format x1, y1, x2, y2, .. The channel name in the string form is obtained from the channelMap parameter using the channel ID stored in extended roi

Parameters

<i>rois</i>	list of rois (linkExtRoi)@paramchannelMapmappingbetweenchannelidsandstrings@paramfilenameoutputfileto
-------------	---

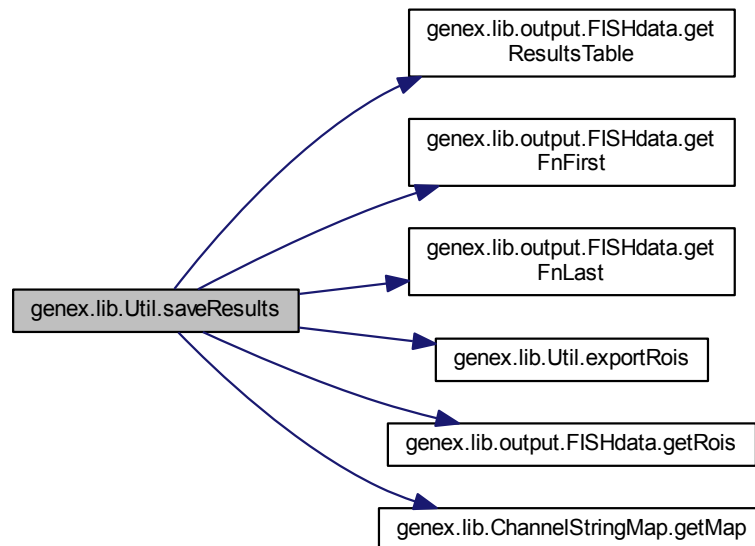
#### 6.46.2.3 void genex.lib.Util.saveResults ( FISHdata data, String descriptor, Boolean exportRoi )

Save results and rois to a CSV-file to a directory set in [ParamDefines.CSV\\_DIR](#). If both fnFirst and fnLast are identical, the data is saved to fn-[dapi|signal].csv, else to fnFirst-fnLast-[dapi|signal].csv

## Parameters

<i>data</i>	FISHdata results table and rois
<i>descriptor</i>	String - additional description, e.g. "dapi", "signals"
<i>exportRoi</i>	boolean - save roi?

Here is the call graph for this function:



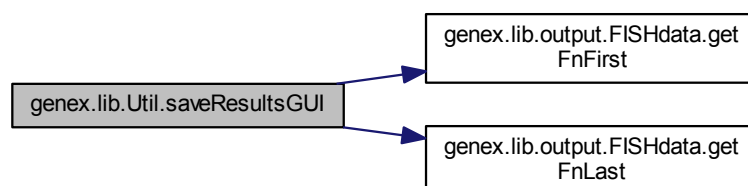
#### 6.46.2.4 void genex.lib.Util.saveResultsGUI ( FISHdata dapiData, FISHdata sigData ) [package]

Helper method to save results table presents directory selection window, constructs file path and calls `saveAs()` method for writing the table to the disk.

## Parameters

<i>dapiData</i>	helper object with results table and extrois, dapi channel
<i>sigData</i>	helper object with results table and extrois, dapi channel

Here is the call graph for this function:



### 6.46.3 Member Data Documentation

6.46.3.1 **String** `genex.lib.Util.dir` = `prefs.get(ParamDefines.CSV_DIR, prefs.get(ParamDefines.LAST_INPUT_DIR, ""))`  
[package]

6.46.3.2 **final Preferences** `genex.lib.Util.prefs` = `Preferences.userRoot().node(ParamDefines.PREFS_ROOT)`  
[package]

The documentation for this class was generated from the following file:

- `src/genex/lib/Util.java`



## Chapter 7

# File Documentation

### 7.1 src/genex/DapiProcessor.java File Reference

#### Classes

- class [genex.DapiProcessor](#)

#### Packages

- package [genex](#)

### 7.2 src/genex/GenexIterator.java File Reference

#### Classes

- class [genex.GenexIterator](#)

#### Packages

- package [genex](#)

### 7.3 src/genex/GenexPipeline.java File Reference

#### Classes

- class [genex.GenexPipeline](#)

#### Packages

- package [genex](#)

### 7.4 src/genex/lib/Channel.java File Reference

## Classes

- class [genex.lib.Channel](#)  
*Single channel representation.*

## Packages

- package [genex.lib](#)

## 7.5 [src/genex/lib/ChannelStringMap.java](#) File Reference

### Classes

- class [genex.lib.ChannelStringMap](#)

### Packages

- package [genex.lib](#)

## 7.6 [src/genex/lib/Dapi.java](#) File Reference

### Classes

- class [genex.lib.Dapi](#)

### Packages

- package [genex.lib](#)

## 7.7 [src/genex/lib/ExtRoi.java](#) File Reference

### Classes

- class [genex.lib.ExtRoi](#)

### Packages

- package [genex.lib](#)

## 7.8 [src/genex/lib/filter/AbstractFilterFactory.java](#) File Reference

### Classes

- interface [genex.lib.filter.AbstractFilterFactory](#)

### Packages

- package [genex.lib.filter](#)
-

## 7.9 src/genex/lib/filter/AreaCircFilter.java File Reference

### Classes

- class [genex.lib.filter.AreaCircFilter](#)

### Packages

- package [genex.lib.filter](#)

## 7.10 src/genex/lib/filter/AreaCircFilterFactory.java File Reference

### Classes

- class [genex.lib.filter.AreaCircFilterFactory](#)

### Packages

- package [genex.lib.filter](#)

## 7.11 src/genex/lib/filter/Filter.java File Reference

### Classes

- interface [genex.lib.filter.Filter](#)

### Packages

- package [genex.lib.filter](#)

## 7.12 src/genex/lib/GenExDefines.java File Reference

### Classes

- class [genex.lib.GenExDefines](#)
- enum [genex.lib.GenExDefines.ChannelNames](#)
- enum [genex.lib.GenExDefines.Filters](#)

### Packages

- package [genex.lib](#)

## 7.13 src/genex/lib/GraphicsUtils.java File Reference

### Classes

- class [genex.lib.GraphicsUtils](#)
-

## Packages

- package [genex.lib](#)

## 7.14 src/genex/lib/i18n/GenExBundle.java File Reference

### Classes

- class [genex.lib.i18n.GenExBundle](#)

## Packages

- package [genex.lib.i18n](#)

## 7.15 src/genex/lib/i18n/GenExBundle\_cs\_CZ.java File Reference

### Classes

- class [genex.lib.i18n.GenExBundle\\_cs\\_CZ](#)

## Packages

- package [genex.lib.i18n](#)

## 7.16 src/genex/lib/i18n/GenExBundle\_en\_US.java File Reference

### Classes

- class [genex.lib.i18n.GenExBundle\\_en\\_US](#)

## Packages

- package [genex.lib.i18n](#)

## 7.17 src/genex/lib/imagereader/FileImgReader.java File Reference

### Classes

- class [genex.lib.imagereader.FileImgReader](#)

## Packages

- package [genex.lib.imagereader](#)
-



## 7.18 src/genex/lib/imagereader/ImageReader.java File Reference

### Classes

- interface [genex.lib.imagereader.ImageReader](#)

### Packages

- package [genex.lib.imagereader](#)

## 7.19 src/genex/lib/imagereader/RGButils.java File Reference

### Classes

- class [genex.lib.imagereader.RGButils](#)

### Packages

- package [genex.lib.imagereader](#)

## 7.20 src/genex/lib/imagereader/ScreenImgReader.java File Reference

### Classes

- class [genex.lib.imagereader.ScreenImgReader](#)

### Packages

- package [genex.lib.imagereader](#)

## 7.21 src/genex/lib/ObjectFilter.java File Reference

### Classes

- class [genex.lib.ObjectFilter](#)

### Packages

- package [genex.lib](#)

## 7.22 src/genex/lib/output/FISHdata.java File Reference

### Classes

- class [genex.lib.output.FISHdata](#)
-

## Packages

- package [genex.lib.output](#)

## 7.23 src/genex/lib/output/Results.java File Reference

### Classes

- class [genex.lib.output.Results](#)

## Packages

- package [genex.lib.output](#)

## 7.24 src/genex/lib/params/ChannelInfo.java File Reference

### Classes

- class [genex.lib.params.ChannelInfo](#)

## Packages

- package [genex.lib.params](#)

## 7.25 src/genex/lib/params/ImageDirInfo.java File Reference

### Classes

- class [genex.lib.params.ImageDirInfo](#)

## Packages

- package [genex.lib.params](#)

## 7.26 src/genex/lib/params/InputGuiMain.java File Reference

### Classes

- class [genex.lib.params.InputGuiMain](#)

## Packages

- package [genex.lib.params](#)
-

## 7.27 src/genex/lib/params/InputGuiUtils.java File Reference

### Classes

- class [genex.lib.params.InputGuiUtils](#)

### Packages

- package [genex.lib.params](#)

## 7.28 src/genex/lib/params/ParamDefines.java File Reference

### Classes

- class [genex.lib.params.ParamDefines](#)

### Packages

- package [genex.lib.params](#)

## 7.29 src/genex/lib/RoiLabeler.java File Reference

### Classes

- class [genex.lib.RoiLabeler](#)

### Packages

- package [genex.lib](#)

## 7.30 src/genex/lib/Segmenation.java File Reference

### Classes

- class [genex.lib.Segmenation](#)

### Packages

- package [genex.lib](#)

## 7.31 src/genex/lib/SigChannel.java File Reference

### Classes

- class [genex.lib.SigChannel](#)

*Channel-specific methods for hybridization signals, extends the [Channel](#) class.*

---

## Packages

- package [genex.lib](#)

## 7.32 src/genex/lib/SignalRoi.java File Reference

### Classes

- class [genex.lib.SignalRoi](#)

## Packages

- package [genex.lib](#)

## 7.33 src/genex/lib/SignalStats.java File Reference

### Classes

- class [genex.lib.SignalStats](#)

## Packages

- package [genex.lib](#)

## 7.34 src/genex/lib/threshold/AbstractThresholdFactory.java File Reference

### Classes

- interface [genex.lib.threshold.AbstractThresholdFactory](#)

## Packages

- package [genex.lib.threshold](#)

## 7.35 src/genex/lib/threshold/CSVWriter.java File Reference

### Classes

- class [genex.lib.threshold.CSVWriter](#)

## Packages

- package [genex.lib.threshold](#)
-

## 7.36 src/genex/lib/threshold/IJAutoThreshold.java File Reference

### Classes

- class [genex.lib.threshold.IJAutoThreshold](#)

### Packages

- package [genex.lib.threshold](#)

## 7.37 src/genex/lib/threshold/IJAutoThresholdFactory.java File Reference

### Classes

- class [genex.lib.threshold.IJAutoThresholdFactory](#)

### Packages

- package [genex.lib.threshold](#)

## 7.38 src/genex/lib/threshold/SnellThreshold.java File Reference

### Classes

- class [genex.lib.threshold.SnellThreshold](#)  
*Implementation of Violet Snell segmentation.*

### Packages

- package [genex.lib.threshold](#)

## 7.39 src/genex/lib/threshold/SnellThresholdFactory.java File Reference

### Classes

- class [genex.lib.threshold.SnellThresholdFactory](#)

### Packages

- package [genex.lib.threshold](#)

## 7.40 src/genex/lib/threshold/Threshold.java File Reference

### Classes

- interface [genex.lib.threshold.Threshold](#)
-

## Packages

- package [genex.lib.threshold](#)

## 7.41 src/genex/lib/Util.java File Reference

### Classes

- class [genex.lib.Util](#)

## Packages

- package [genex.lib](#)

## 7.42 src/genex/SignalProcessor.java File Reference

### Classes

- class [genex.SignalProcessor](#)

## Packages

- package [genex](#)

## 7.43 src/GenExParams\_.java File Reference

### Classes

- class [GenExParams\\_](#)

## 7.44 src/GenExPlugin\_.java File Reference

### Classes

- class [GenExPlugin\\_](#)  
*Plugin entry class.*
-

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