

# Package ‘RGalaxy’

October 12, 2016

**Title** Make an R function available in the Galaxy web platform

**Description** Given an R function and its manual page, make the documented function available in Galaxy.

**Version** 1.16.2

**Author** Dan Tenenbaum

**Maintainer** Bioconductor Package Maintainer <maintainer@bioconductor.org>

**biocViews** Infrastructure

**Depends** XML, methods, tools, optparse, digest,

**Imports** BiocGenerics, Biobase, roxygen2

**Suggests** RUnit, hgu95av2.db, knitr, formatR, Rserve

**Enhances** RScient

**License** Artistic-2.0

**KeepSource** TRUE

**Collate** 'AllClasses.R' 'galaxy.R' 'man.R' 'test\_functions.R' 'utils.R'

**VignetteBuilder** knitr

**NeedsCompilation** no

## R topics documented:

addTwoNumbers	2
addTwoNumbersWithTest	3
anotherTestFunction	3
foo	4
functionToGalaxify	5
galaxy	6
GalaxyClasses	8
GalaxyConfig-class	9
GalaxyInputFile-class	10
GalaxyOutput-class	11
getFriendlyName	12
gmessage	12

probeLookup . . . . .	13
RserveConnection-class . . . . .	14
runFunctionalTest . . . . .	15
testFunctionWithGalaxySelectParam . . . . .	15
testFunctionWithSelect . . . . .	16

<b>Index</b>	<b>17</b>
--------------	-----------

---

addTwoNumbers	<i>Add two numbers</i>
---------------	------------------------

---

## Description

An example function that can be made into a Galaxy tool. Takes two numbers, adds them, and returns a file containing the result.

## Usage

```
addTwoNumbers(number1=GalaxyNumericParam(required=TRUE),
              number2=GalaxyNumericParam(required=TRUE),
              sum=GalaxyOutput("sum", "txt"))
```

## Arguments

number1	The first number to add.
number2	The second number to add.
sum	Where the result of the addition should be written.

## Value

invisible(NULL)

## See Also

[galaxy](#), [GalaxyConfig](#), [GalaxyOutput](#), [addTwoNumbers](#)

## Examples

```
t <- tempfile()
addTwoNumbers(2, 2, t)
readLines(t, warn=FALSE)
```

---

addTwoNumbersWithTest *Add two numbers (with functional test)*

---

### Description

An example function that can be made into a Galaxy tool. Takes two numbers, adds them, and returns a file containing the result. This version demonstrates a functional test.

### Usage

```
addTwoNumbersWithTest(number1=GalaxyNumericParam(required=TRUE, testValues=5L),
  number2=GalaxyNumericParam(required=TRUE, testValues=5L),
  sum=GalaxyOutput("sum", "txt"))
```

### Arguments

number1	The first number to add.
number2	The second number to add.
sum	Where the result of the addition should be written.

### Value

invisible(NULL)

### See Also

[galaxy](#), [GalaxyConfig](#), [GalaxyOutput](#), [addTwoNumbers](#)

### Examples

```
t <- tempfile()
addTwoNumbersWithTest(2, 2, t)
readLines(t, warn=FALSE)
runFunctionalTest(addTwoNumbersWithTest) ## should return TRUE
```

---

anotherTestFunction *Add two matrices*

---

### Description

An example function that can be made into a Galaxy tool. Reads matrices from two tab-delimited files, adds them, and writes the result to a comma-separated file and a PDF plot.

**Usage**

```
anotherTestFunction(inputfile1=GalaxyInputFile(),
  inputfile2=GalaxyInputFile(),
  plotTitle=GalaxyCharacterParam(c("TitleA"="A", "TitleB"="B")),
  plotSubTitle=GalaxyCharacterParam("My subtitle"),
  outputfile1=GalaxyOutput("mydata", "csv"),
  outputfile2=GalaxyOutput("myplot", "pdf"))
```

**Arguments**

inputfile1	The filename of the first tab-separated matrix.
inputfile2	The filename of the second tab-separated matrix.
plotTitle	The title of the plot to create.
plotSubTitle	The subtitle of the plot to create.
outputfile1	The filename of the comma-separated output file to generate.
outputfile2	The filename of the PDF plot file to create.

**Value**

invisible(NULL)

**See Also**

[galaxy](#), [GalaxyConfig](#), [GalaxyOutput](#)

**Examples**

```
anotherTestFunction(system.file("extdata", "a.tsv", package="RGalaxy"),
  system.file("extdata", "b.tsv", package="RGalaxy"),
  "My Plot Title", "My Plot Subtitle",
  "output.csv", "output.pdf")
```

---

foo

*a foo function*

---

**Description**

a foo function

**Usage**

```
foo(input = GalaxyInputFile(), x = GalaxyNumericParam(),
  y = TRUE,
  z = GalaxyCharacterParam(c("Seattle", "Tacoma", "Olympia")),
  output = GalaxyOutput("pdf"))
```

**Arguments**

input	An input dataset
x	the x param
y	the y param
z	the z param
output	the output

**Details**

nothing

---

functionToGalaxify     *Add two matrices*

---

**Description**

An example function that can be made into a Galaxy tool. Reads matrices from two tab-delimited files, adds them, and writes the result to a comma-separated file and a PDF plot.

**Usage**

```
functionToGalaxify(inputfile1=GalaxyInputFile(),
  inputfile2=GalaxyInputFile(),
  plotTitle=GalaxyCharacterParam(testValues="test plot title"),
  plotSubTitle=GalaxyCharacterParam("My subtitle",
    testValues="test plot subtitle"),
  outputfile1=GalaxyOutput("mydata", "csv"),
  outputfile2=GalaxyOutput("myplot", "png"))
```

**Arguments**

inputfile1	The filename of the first tab-separated matrix.
inputfile2	The filename of the second tab-separated matrix.
plotTitle	The title of the plot to create.
plotSubTitle	The subtitle of the plot to create.
outputfile1	The filename of the comma-separated output file to generate.
outputfile2	The filename of the PNG plot file to create.

## Details

This trivial method illustrates some best practices to use when writing functions to be adapted as Galaxy tools. For example, any error conditions should be handled with `stop` with a useful/informative error message. The Galaxy user will see these messages if an error occurs.

Functions which take datasets as input should accept as arguments the filenames pointing to those datasets. The Galaxy user interface will allow the user to choose the dataset graphically.

Return values of functions are ignored. Function output should be written to one or more files, and the names of these files should be passed into the function as arguments.

Functions should be documented with a manual page. RGalaxy will use this manual page to fill in relevant sections of the Galaxy XML file.

## Value

`invisible(NULL)`

## See Also

[galaxy](#), [GalaxyConfig](#), [GalaxyOutput](#)

## Examples

```
functionToGalaxyify(system.file("extdata", "a.tsv", package="RGalaxy"),
  system.file("extdata", "b.tsv", package="RGalaxy"),
  "My Plot Title", "My Plot Subtitle",
  "output.csv", "output.pdf")
```

---

galaxy

*Make a function available in Galaxy*

---

## Description

Makes an R function available in the Galaxy web platform. Automates all the work necessary to expose an R function in Galaxy. See the vignette for more information

## Usage

```
galaxy(func,
  package=getPackage(func),
  manpage=func,
  name=getFriendlyName(func),
  version=getVersion(func),
  galaxyConfig,
  dirToRoxygenize,
  RserveConnection=NULL,
  path.to.R="",
```

functionalTestDirectory)

## Arguments

func	<b>Required.</b> TA character vector naming the function to make available in Galaxy. This function should be entirely-self contained, and should accept as arguments the full paths to its input and output file(s).
package	The name of the package where func lives, or NULL if it is not in a package. By default, RGalaxy will try to determine which package the code lives in and set the parameter to NULL if it cannot.
manpage	The full path to the Rd-formatted manual page for the function, or if the func is in a package, an alias that will pull up that manpage.
name	Text describe the action this function performs. Becomes a clickable link in Galaxy. By default, if your function is called "fooBar", name is set to "Foo Bar".
version	The version of this function. If func lives in a package, defaults to the version of package.
galaxyConfig	<b>Required.</b> A link{GalaxyConfig} object describing your Galaxy configuration.
dirToRoxygenize	If present, points to the directory of a source package upon which to run roxygenize() from the roxygen2 package, creating manual pages from source code comments.
RserveConnection	If set (by calling <a href="#">RserveConnection</a> ), sends the function to a running Rserve for evaluation. This can make functions run faster since dependencies have already been loaded. If NULL (the default), function is run normally. See vignette for more information.
path.to.R	If not empty, Galaxy will look for R in this directory. This is useful if there are multiple versions of R on your system and your Galaxy configuration prevents you from setting your PATH to point to the right one.
functionalTestDirectory	If package is not specified, this directory is searched for functional test fixtures.

## Value

invisible(NULL)

## See Also

[GalaxyConfig](#), [GalaxyOutput](#), [GalaxyParam](#)

## Examples

```
## set up galaxyHome (you don't need to do this if
## you really have Galaxy installed)
galaxyHome <- tempdir()
dir.create(galaxyHome, recursive=TRUE, showWarnings=FALSE)
```

```

file.copy(system.file("galaxy", "tool_conf.xml", package="RGalaxy"),
  file.path(galaxyHome, "tool_conf.xml"), overwrite=FALSE)

## Not run:
galaxy("functionToGalaxify",
  galaxyConfig=GalaxyConfig(galaxyHome, "mytool",
    "Test Section", "testSectionId"),
  RserveConnection=RserveConnection())

## End(Not run)

```

---

GalaxyClasses

*Galaxy Parameter Classes*


---

### Description

Galaxy Parameter Classes These classes encapsulate parameters to be passed to functions exposed in Galaxy.

### Usage

GalaxyIntegerParam(...)

GalaxyNumericParam(...)

GalaxyCharacterParam(...)

GalaxyLogicalParam(...)

GalaxySelectParam(...)

### Arguments

... Arguments can be a single unnamed argument, corresponding to the name of the class, e.g., integer, numeric, character, or logical.

The first argument can be missing, can be of length 1 or can be a vector of a greater length, in which case it is rendered as a dropdown (select) list.

**testValues:** (optional) Either an integer(1), numeric(1), character(1), or logical(1), depending on the class used. A value to be used in functional testing (running your function with a fixed set of inputs and checking that the outputs match what is expected).

Additional parameters are as follows:

**label:** A character(1). The friendly name for this parameter. By default, RGalaxy will use the parameter's name ("fooBar" is changed to "Foo Bar") if this is not supplied.



- min:** (optional) An integer(1). If the parameter is integer or numeric, this specifies a minimum value for the parameter. Galaxy will not allow lower values.
- max:** (optional) An integer(1). If the parameter is integer or numeric, this specifies a maximum value for the parameter. Galaxy will not allow higher values.
- force\_select:** (default: FALSE) A logical(1). If this parameter is a dropdown list (i.e., the first argument is a vector of length > 1), a TRUE value forces the user to select an item.
- display:** (optional) A character(1). If parameter is a dropdown list, this can be set to "checkboxes" or "radio" which renders the list as a set of check boxes or radio buttons. Defaults to a drop-down menu select list.
- checked:** (default: FALSE) A logical(1). Whether the rendered checkbox should be checked. Only applicable if the parameter is a logical of length < 2.
- size:** (default: 60L) An integer(1) The width of the field, in characters. For character parameters only.
- required:** (default: FALSE) A logical(1). Whether Galaxy will require this field be filled in.
- requiredMsg:** (default: "This field is required.") A character(1) If required is TRUE, the message to display to the user when the leave the field empty.

## Details

The arguments to these classes are based on [http://wiki.g2.bx.psu.edu/Admin/Tools/Tool%20Config%20Syntax#A.3Cparam.3E\\_tag\\_set](http://wiki.g2.bx.psu.edu/Admin/Tools/Tool%20Config%20Syntax#A.3Cparam.3E_tag_set)

## Examples

```
GalaxyIntegerParam()
GalaxyIntegerParam(1L)
GalaxySelectParam(c(a=1L, b=2L))

GalaxyNumericParam(2.0, required=TRUE)

GalaxySelectParam(c("First Choice"="one",
"Second Choice"="two")) # a select list
GalaxyLogicalParam(checked=TRUE)
```

---

GalaxyConfig-class	Class "GalaxyConfig"
--------------------	----------------------

---

## Description

Represents information about the configuration of Galaxy.

## Usage

```
GalaxyConfig(galaxyHome, toolDir, sectionName, sectionId)
```

**Arguments**

galaxyHome	<b>Required.</b> The full path to your Galaxy distribution.
toolDir	<b>Required.</b> The directory where the files associated with your function will reside.
sectionName	<b>Required</b> A friendly name for the section of Galaxy tools that will contain your function. Multiple tools can be in a single section; section names are headings in the left-hand side of the Galaxy window. If multiple tools are to reside in the same section, they must have identical values for sectionName and sectionId.
sectionId	An internal identifier for the section of Galaxy tools that will contain your function. If multiple tools are to reside in the same section, they must have identical values for sectionName and sectionId.

**Methods**

No methods defined with class "GalaxyConfig" in the signature.

**See Also**

link{galaxy}, [GalaxyOutput](#)

**Examples**

```
GalaxyConfig(galaxyHome=getwd(), toolDir="mytool", sectionName="Test Section",
             sectionId="testSectionId")
```

---

GalaxyInputFile-class *Class "GalaxyInputFile"*

---

**Description**

Represents a dataset hosted on Galaxy, to be passed to an R function that you expose in Galaxy.

**Usage**

```
GalaxyInputFile(required=TRUE, formatFilter=character(0))
```

**Arguments**

required	Whether to require that the user provide this dataset.
formatFilter	(optional) A file type for filtering the list of possible input data sets. Should be one of the file types listed in the datatypes_conf.xml file in the root of your Galaxy distribution.

**Methods**

No methods defined with class "GalaxyInputFile" in the signature.

**See Also**

link{galaxy}, [GalaxyConfig](#)

**Examples**

```
inputfile1=GalaxyInputFile()
## The user can only choose csv files:
inputfile2=GalaxyInputFile(formatFilter="csv")
```

---

GalaxyOutput-class      *Class "GalaxyOutput"*

---

**Description**

Represents an output file generated by an R function in Galaxy.

**Usage**

```
GalaxyOutput(basename, format)
```

**Arguments**

basename      **Required.** The name of the output file, minus the extension.

format      **Required.** The file type of the output file. For suggested extensions, see GALAXY\_HOME/datatypes\_con

**Methods**

No methods defined with class "GalaxyOutput" in the signature.

**See Also**

link{galaxy}, [GalaxyConfig](#)

**Examples**

```
params <- list(
  outputfile1=GalaxyOutput("plot", "pdf"),
  outputfile2=GalaxyOutput("data", "csv"))
```

getFriendlyName      *Change a camelCase name to a friendlier version*

---

### Description

Takes a string like "fooBarBaz" and returns "Foo Bar Baz".

### Usage

```
getFriendlyName(camelName)
```

### Arguments

camelName      The "camelCased" name to make friendly.

### Details

Used by `galaxy()` to create default labels based on function and parameter names.

### Value

The friendly version of the camel-cased name.

### See Also

[galaxy](#), [GalaxyConfig](#), [GalaxyOutput](#)

### Examples

```
getFriendlyName("fooBarBaz")
```

---

gmessage      *Sends informational, warning, and error messages to the user.*

---

### Description

Send error, warning, and informational messages to the user. Use these instead of [message](#), [warning](#), and [stop](#). Output is wrapped consistently and passed through [sprintf](#) so you can use inline formatting (see examples). Output of `gstop` will appear in Galaxy user's web browser.

### Usage

```
gmessage(..., appendLF = TRUE)
```

```
gstop(..., call. = FALSE)
```

```
gwarning(..., call. = FALSE, immediate. = FALSE)
```

**Arguments**

... Passed to `sprintf`.  
 appendLF Passed to `message`.  
 call. Passed to `stop` or `warning`.  
 immediate. Passed to `warning`.

**Value**

NULL

**See Also**

`message`, `warning`, `stop`, `sprintf`

**Examples**

```
gmessage("This is an %s message.", "example")
## Not run:
gstop("Encountered a %s error.", "serious")

## End(Not run)
## Not run:
gwarning("Something is not quite right.")

## End(Not run)
```

---

probeLookup

*Get the PFAM and SYMBOL names for a set of Affymetrix probe IDs*

---

**Description**

Given a space-separated list of Affymetrix probe IDs, return the PFAM and SYMBOL names. Uses `hgu95av2.db` and the `select` method from the `AnnotationDbi` package.

**Usage**

```
probeLookup(probe_ids=GalaxyCharacterParam(
  required=TRUE,
  testValues="1002_f_at 1003_s_at"),
  outputfile=GalaxyOutput("probeLookup", "csv"))
```

**Arguments**

`probe_ids` A space-separated list of Affymetrix probe IDs.  
`outputfile` The name of a `.csv` file where the returned output is to be written.

**Details**

Given one or more Affymetrix probe IDs separated by spaces, this function will return the PFAM and SYMBOL names associated with them in human. The function uses the hgu95av2.db package and the select function in AnnotationDbi.

**Value**

invisible(NULL)

**Examples**

```
t <- tempfile()
probeLookup("1002_f_at 1003_s_at", t)
readLines(t)
```

---

RserveConnection-class

*Class "RserveConnection"*

---

**Description**

Represents a connection to Rserve.

**Usage**

```
RserveConnection(...)
```

**Arguments**

...            **host** character(1) The name of the host. Defaults to "localhost".  
              **port** integer(1) The port. Defaults to 6311L.

**Methods**

No methods defined with class "RserveConnection" in the signature.

**See Also**

link{galaxy}, [GalaxyOutput](#)

**Examples**

```
RserveConnection(host="myhost", port=2012L)
```

---

runFunctionalTest      *Run the functional test associated with a function.*

---

**Description**

FIXME

**Usage**

```
runFunctionalTest(func, functionalTestDirectory)
```

**Arguments**

func                    A function to be exposed in Galaxy.  
functionalTestDirectory      Where to find functional tests, if func is not in a package.

**Value**

Whether the test passes.

---

testFunctionWithGalaxySelectParam  
*A variation on functionToGalaxy that takes a multiple-choice option using the GalaxySelectParam class.*

---

**Description**

A variation on functionToGalaxy that takes a multiple-choice option using the GalaxySelectParam class.

**Usage**

```
testFunctionWithGalaxySelectParam(inputfile1 = GalaxyInputFile(),  
  inputfile2 = GalaxyInputFile(),  
  plotTitle = GalaxySelectParam(c(TitleA = "A"), force_select = TRUE),  
  plotSubTitle = GalaxyCharacterParam("My subtitle"),  
  outputfile1 = GalaxyOutput("mydata", "csv"),  
  outputfile2 = GalaxyOutput("myplot", "pdf"))
```

**Arguments**

inputfile1	the first matrix
inputfile2	the second matrix
plotTitle	the plot title
plotSubTitle	the plot subtitle
outputfile1	the csv output file
outputfile2	the pdf output file

**Details**

There are no details.

---

testFunctionWithSelect

*A variation on functionToGalaxy that takes a multiple-choice option.*

---

**Description**

A variation on functionToGalaxy that takes a multiple-choice option.

**Usage**

```
testFunctionWithSelect(inputfile1 = GalaxyInputFile(),
  inputfile2 = GalaxyInputFile(),
  plotTitle = GalaxyCharacterParam(c(TitleA = "A", TitleB = "B"), force_select = TRUE),
  plotSubTitle = GalaxyCharacterParam("My subtitle"),
  outputfile1 = GalaxyOutput("mydata", "csv"),
  outputfile2 = GalaxyOutput("myplot", "pdf"))
```

**Arguments**

inputfile1	the first matrix
inputfile2	the second matrix
plotTitle	the plot title
plotSubTitle	the plot subtitle
outputfile1	the csv output file
outputfile2	the pdf output file

**Details**

There are no details.



# Index

## \*Topic **classes**

- GalaxyConfig-class, 9
  - GalaxyInputFile-class, 10
  - GalaxyOutput-class, 11
  - RserveConnection-class, 14
- addTwoNumbers, 2, 2, 3
- addTwoNumbersWithTest, 3
- anotherTestFunction, 3
- foo, 4
- functionToGalaxify, 5
- galaxy, 2–4, 6, 6, 12
- GalaxyCharacterParam (GalaxyClasses), 8
  - GalaxyCharacterParam-class (GalaxyClasses), 8
  - GalaxyClasses, 8
  - GalaxyConfig, 2–4, 6, 7, 11, 12
  - GalaxyConfig (GalaxyConfig-class), 9
  - GalaxyConfig-class, 9
  - GalaxyInputFile (GalaxyInputFile-class), 10
  - GalaxyInputFile-class, 10
  - GalaxyIntegerParam (GalaxyClasses), 8
  - GalaxyIntegerParam-class (GalaxyClasses), 8
  - GalaxyLogicalParam (GalaxyClasses), 8
  - GalaxyLogicalParam-class (GalaxyClasses), 8
  - GalaxyNumericParam (GalaxyClasses), 8
  - GalaxyNumericParam-class (GalaxyClasses), 8
  - GalaxyOutput, 2–4, 6, 7, 10, 12, 14
  - GalaxyOutput (GalaxyOutput-class), 11
  - GalaxyOutput-class, 11
  - GalaxyParam, 7
  - GalaxyParam (GalaxyClasses), 8
  - GalaxySelectParam (GalaxyClasses), 8
  - GalaxySelectParam-class (GalaxyClasses), 8
  - getFriendlyName, 12
  - gmessage, 12
  - gstop (gmessage), 12
  - gwarning (gmessage), 12
  - message, 12, 13
  - probeLookup, 13
  - RserveConnection, 7
  - RserveConnection (RserveConnection-class), 14
  - RserveConnection-class, 14
  - runFunctionalTest, 15
  - sprintf, 12, 13
  - stop, 12, 13
  - testFunctionWithGalaxySelectParam, 15
  - testFunctionWithSelect, 16
  - warning, 12, 13