

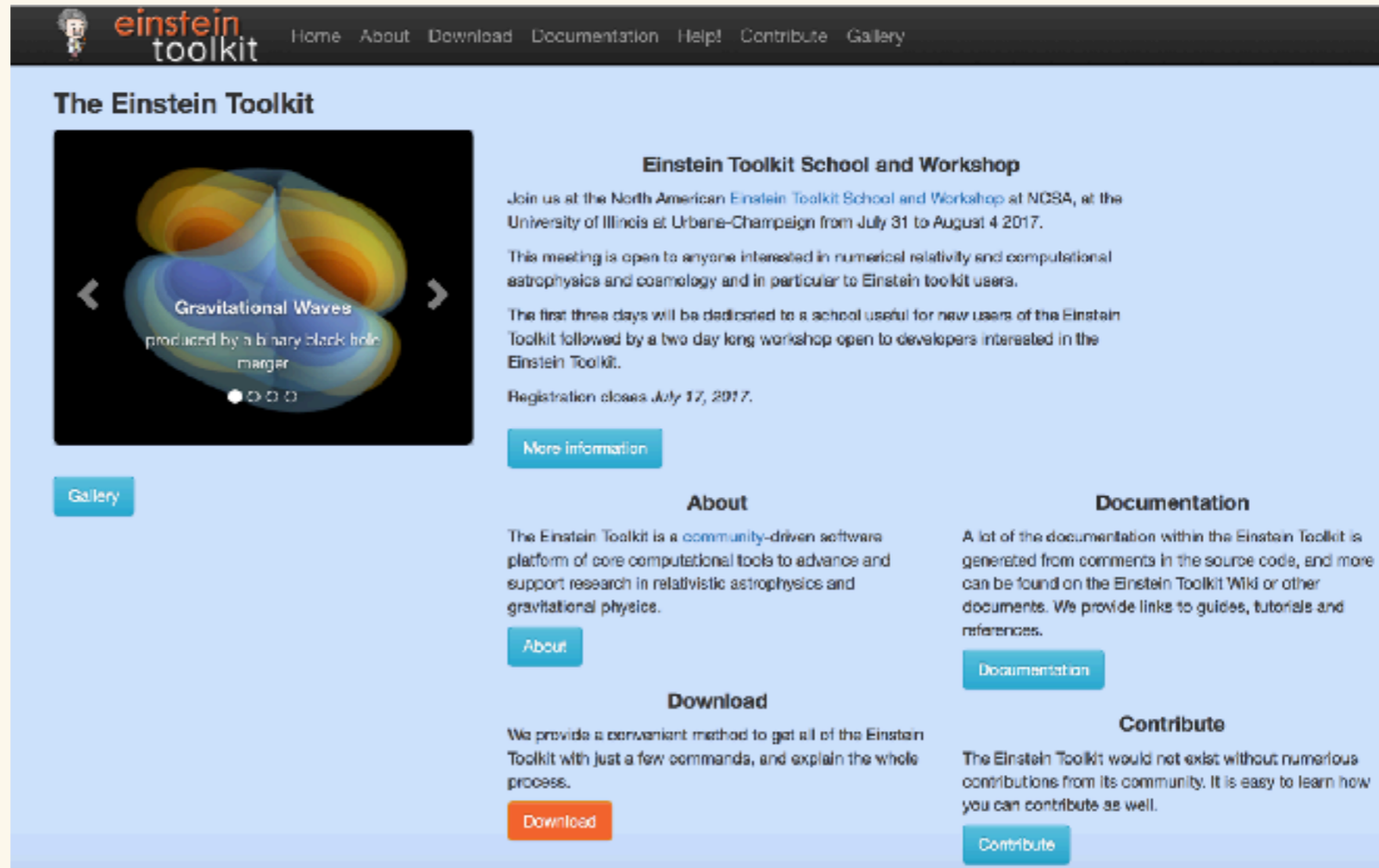
Hands on codes!

The Einstein Toolkit

The Einstein Toolkit (einsteintoolkit.org) is a community-driven software platform of core computational tools to advance and support research in relativistic astrophysics and gravitational physics.

It includes:

- spacetime evolution code
- GRHydro codes
- GRMHD codes
- some initial data
- some analysis codes (including horizon finding)



The screenshot shows the homepage of the Einstein Toolkit website. At the top, there is a navigation bar with the logo and links for Home, About, Download, Documentation, Help!, Contribute, and Gallery. The main content area features a large image of gravitational waves with the text "Gravitational Waves produced by a binary black hole merger". Below this image is a "Gallery" button. To the right, there is a section for the "Einstein Toolkit School and Workshop" with a "More information" button. Further down, there are sections for "About", "Download", "Documentation", and "Contribute", each with a corresponding button.

The Einstein Toolkit

Einstein Toolkit School and Workshop

Join us at the North American Einstein Toolkit School and Workshop at NCSA, at the University of Illinois at Urbana-Champaign from July 31 to August 4 2017.

This meeting is open to anyone interested in numerical relativity and computational astrophysics and cosmology and in particular to Einstein toolkit users.

The first three days will be dedicated to a school useful for new users of the Einstein Toolkit followed by a two day long workshop open to developers interested in the Einstein Toolkit.

Registration closes July 17, 2017.

[More information](#)

About

The Einstein Toolkit is a community-driven software platform of core computational tools to advance and support research in relativistic astrophysics and gravitational physics.

[About](#)

Download

We provide a convenient method to get all of the Einstein Toolkit with just a few commands, and explain the whole process.

[Download](#)

Documentation

A lot of the documentation within the Einstein Toolkit is generated from comments in the source code, and more can be found on the Einstein Toolkit Wiki or other documents. We provide links to guides, tutorials and references.

[Documentation](#)

Contribute

The Einstein Toolkit would not exist without numerous contributions from its community. It is easy to learn how you can contribute as well.

[Contribute](#)

The Einstein Toolkit

The Einstein Toolkit

- provides computational infrastructure:
 - parallelisation
 - portability
 - mesh refinement
 - multidimensional input/output
 - timing and memory-use reports
 - simulation-management tools
 - user support through various channels
- requests to cite a few publications: the Toolkit itself and the references for the individual components, if necessary

Let's install the Einstein Toolkit

Here are commands based on

https://docs.einsteintoolkit.org/et-docs/Simplified_Tutorial_for_New_Users

- Install required software:

- # Ubuntu

```
sudo apt-get install build-essential mpich2? python libmpich2?-dev gfortran git subversion curl  
gnuplot gnuplot-x11
```

- # Debian

```
su -c 'apt-get install build-essential libopenmpi-dev openmpi-bin gfortran git subversion curl gnuplot  
gnuplot-x11'
```

- # Fedora

```
su -c 'yum -y install mpich2 python mpich2-devel gsl gsl-devel libjpeg-devel hdf5 hdf5-mpich-devel  
gcc gcc-c++ gcc-gfortran patch numactl-devel numactl hwloc subversion git openssl-devel lapack-  
static'
```

- # mac OSX MacPorts

```
sudo port install subversion git gnuplot szip jpeg gcc46 fftw fftw-3 gsl openssl hdf5 +fortran +gcc46  
-universal zlib openmpi +gcc46
```

- # mac OSX Homebrew

```
brew tap homebrew/science  
brew install subversion gnuplot subversion gcc fftw gsl hdf5 --with-fortran hwloc jpeg openssl pkg-  
config szip open-mpi
```

Let's install the Einstein Toolkit

- Visit the page <https://einsteintoolkit.org/download.html>
- Download and prepare GetComponents:
 - `curl -O -L https://raw.githubusercontent.com/gridaphobe/CRL/ET_2016_11/GetComponents`
 - `chmod a+x GetComponents`
- Download the full code:
 - `./GetComponents --parallel https://bitbucket.org/einsteintoolkit/manifest/raw/ET_2016_11/einsteintoolkit.th --root`

Let's install the Einstein Toolkit

- Set up SimFactory:

- # for Ubuntu

- ```
./simfactory/bin/sim setup --optionlist=ubuntu.cfg --runscript debian.sh
```

- # for Debian

- ```
./simfactory/bin/sim setup --optionlist=debian.cfg --runscript debian.sh
```

- # for Fedora (you may have to log out and back in if you have just installed mpich to make the module command work)

- ```
module load mpi
```

- ```
./simfactory/bin/sim setup --optionlist=fedora.cfg --runscript debian.sh
```

- # mac OSX MacPorts

- ```
./simfactory/bin/sim setup --optionlist=osx-macports.cfg --runscript osx-macports.run
```

- # mac OSX Homebrew

- ```
export CPATH=/usr/local/include LIBRARY_PATH=/usr/local/lib
```

- ```
./simfactory/bin/sim setup --optionlist=osx-homebrew.cfg --runscript generic-mpi.run
```

- Compile a configuration

- ```
./simfactory/bin/sim build mini_school_GW --mdbkey make 'make -j2' --thornlist=manifest/einsteintoolkit.th
```

Let's run the Einstein Toolkit

- Run a simulation:

- `./simfactory/bin/sim submit static_tov --configuration=mini_school_GW --parfile=par/static_tov.par --procs=1`

- View the standard output and error:

- `./simfactory/bin/sim show-output --follow static_tov`