**Blue Waters Petascale Semester Curriculum v1.0**

**Unit 11: Domain Science: Astrophysical Fluid Dynamics**

**Lesson 3: Fluid Hydrodynamics**

**Instructor Guide**

*Developed by* *Marc Gagné and Roman Voronov for the Shodor Education Foundation, Inc.*



*Except where otherwise noted, this work by The Shodor Education Foundation, Inc. is licensed under CC BY-SA 4.0. To view a copy of this license, visit*[*https://creativecommons.org/licenses/by-sa/4.0*](https://creativecommons.org/licenses/by-sa/4.0)

*Browse and search the full curriculum at*[*http://shodor.org/petascale/materials/semester-curriculum*](http://shodor.org/petascale/materials/semester-curriculum)

*We welcome your improvements! You can submit your proposed changes to this material and the rest of the curriculum in our GitHub repository at*[*https://github.com/shodor-education/petascale-semester-curriculum*](https://github.com/shodor-education/petascale-semester-curriculum)

*We want to hear from you! Please let us know your experiences using this material by sending email to* [*petascale@shodor.org*](mailto:petascale@shodor.org)

### 11.3 Activity 1

Instructors are encouraged to obtain an allocation for their students, either on a HPC cluster at their institution, or with NCSA (Blue Waters) or XSEDE, which are open to the U.S. academic and research communities. There may be an XSEDE Campus Champion at your institution, or you can become a Campus Champion.

#### Public Resources:

* National Center for Supercomputing Applications (NCSA): Blue Waters
  + About: <https://bluewaters.ncsa.illinois.edu/about-blue-waters>
  + Hardware: <https://bluewaters.ncsa.illinois.edu/hardware-summary>
  + Getting Started: <https://bluewaters.ncsa.illinois.edu/documentation>
  + Education Allocations: <https://bluewaters.ncsa.illinois.edu/education-allocations>
* The eXtreme Science and Engineering Discovery Environment (XSEDE)
  + Resources: <https://portal.xsede.org/allocations/resource-info>
  + Create an XSEDE account: <https://portal.xsede.org/#/guest>
  + Startup allocations: <https://portal.xsede.org/allocations/startup>
  + Education allocations: <https://portal.xsede.org/allocations/education>
  + Current Campus Champions: [Current Champions](https://www.xsede.org/web/site/community-engagement/campus-champions/current)
  + Campus Champions Program: [Campus Champions](https://www.xsede.org/community-engagement/campus-champions)

Once you have an allocation, we encourage you to send detailed instructions to your students before the start of the course/semester/internship so that they may get started. Some students may decide to use PuTTY or ssh from a terminal on a PC or Mac, others may decide to install Linux on their PC to run applications directly. We recommend the latest stable version of SuSE or CentOS, since those are the platforms used by Blue Waters and XSEDE, respectively.

### 11.3 Activity 2

The last two lessons of this unit will be using the publicly available PLUTO code to perform astrophysical hydrodynamic calculations, and the VisIt code

[11.3 Submitting Jobs and Running Programs on Blue Waters](https://docs.google.com/document/d/1KFRjHEi7JooQvVH1Vl_uzRypOShjz5CHKmqedaohBYg/edit#heading=h.daenv6po4lwl)