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

**Unit 6: Hybrid MPI + OpenMP**

**Lesson 1: Introduction to Hybrid**

**Instructor Guide**

*Developed by 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-NC 4.0. To view a copy of this license, visit*[*https://creativecommons.org/licenses/by-nc/4.0*](https://creativecommons.org/licenses/by-nc/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)

It is suggested that the instructor who is familiar with MPI and OpenMP study the following preparation materials about Hybrid computing:

“*Best Practice Guide to Hybrid MPI + OpenMP Programming*”

<http://www.intertwine-project.eu/sites/default/files/images/INTERTWinE_Best_Practice_Guide_MPI%2BOpenMP_1.1.pdf>

“*Hybrid MPI and OpenMP Parallel Programming*”

<https://www.youtube.com/watch?v=vvMB3nmr608>

“*Hybrid Programming with MPI and OpenMP | Deepak Eachempati, University of Houston*”

<https://www.youtube.com/watch?v=sgrIUHml7hU>

**Common Pitfalls for Students and Instructors**

Lack of background in MPI and/or OpenMP is a serious pitfall for this lesson.