ACES: Introduction to Julia

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High Performance
Research Computing
DIVISION OF RESEARCH

Introduction to Julia: Outline

Part I: A brief overview of Julia

Julia is a high-level general-purpose dynamic programming language primarily designed for **high-performance numerical analysis and computational science**.

- Born in MIT's Computer Science and Artificial Intelligence Lab in 2009
- Combined the best features of Ruby, MatLab, C, Python, R, and others
- First release in 2012
- Latest stable release v1.12.6
- https://julialang.org/
- customized for "greedy, unreasonable, demanding programmers"
- Julia Computing established in 2015 to provide commercial support

Major features of **Julia:**

- **Fast**: designed for high performance
- **General**: supports different programming patterns
- **Dynamic**: dynamically-typed with good support for interactive use
- **Technical**: efficient numerical computing with a mathematics-friendly syntax
- **Optionally typed**: a rich language of descriptive data types
- **Composable**: Julia's packages naturally work well together

"Julia is as programmable as Python while it is as fast as Fortran for number crunching. It is like ***Python on steroids****."*

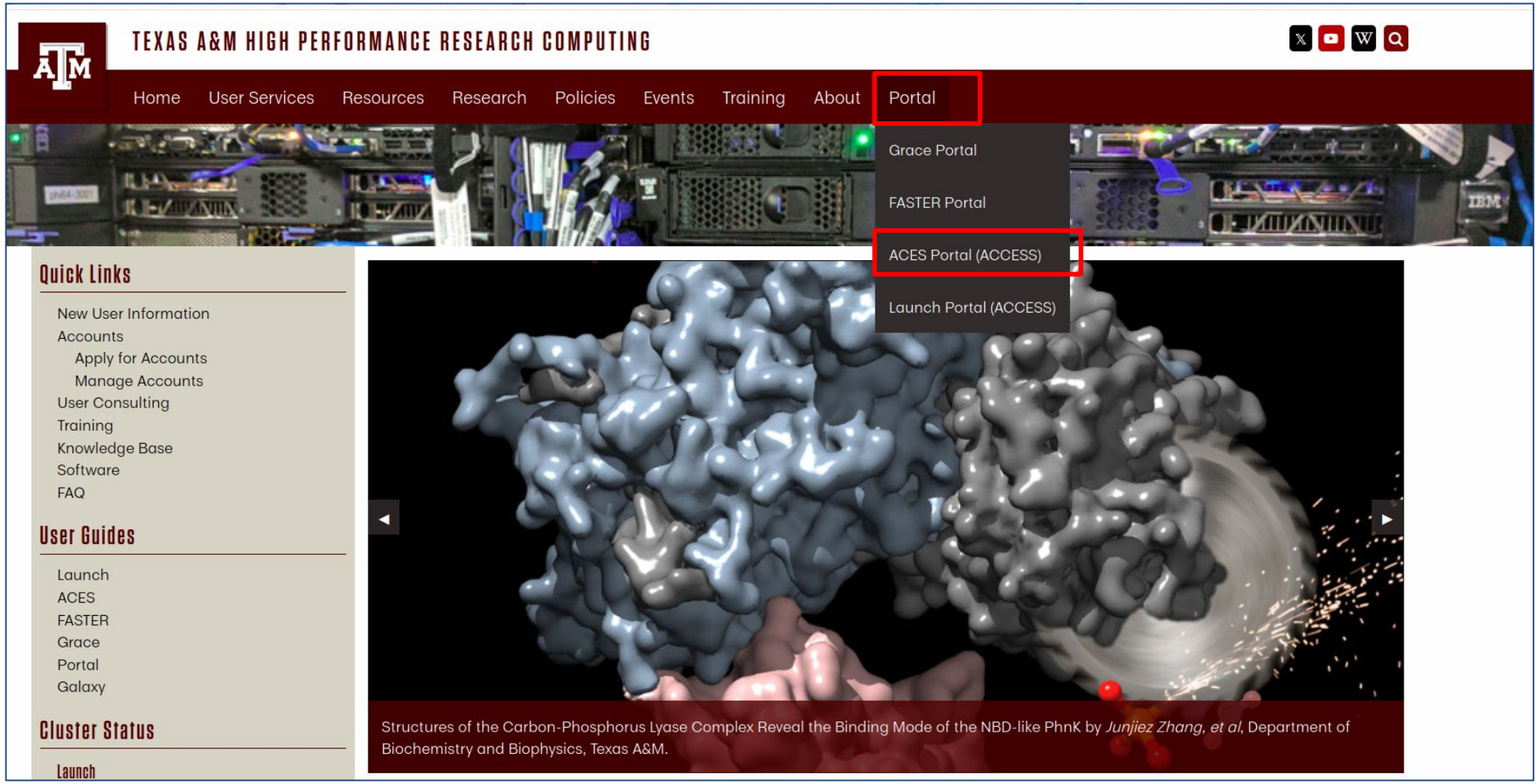
--an anonymous Julia user on the first impression of Julia.

Where to Run Julia

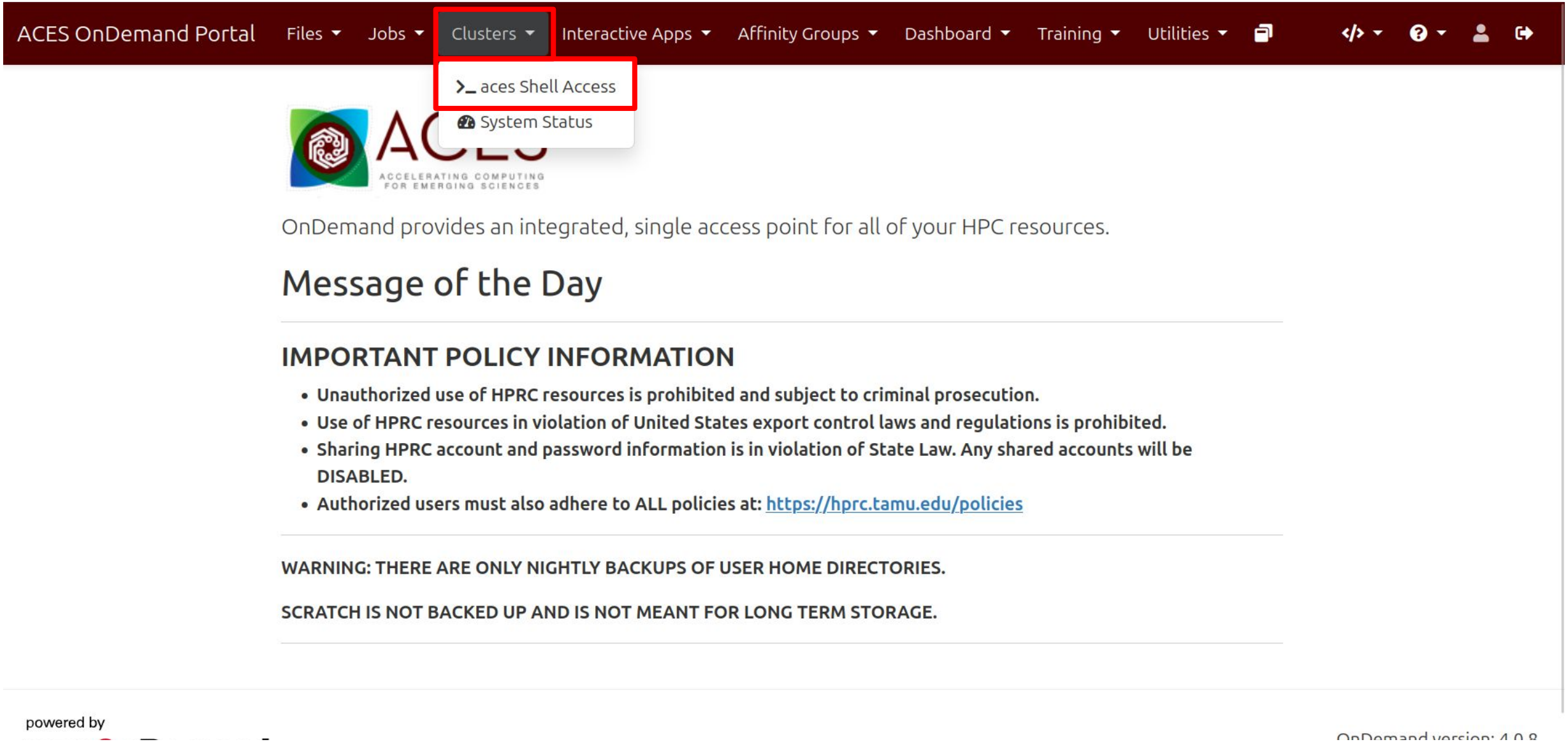
- VSCode - extensions for Julia are actively being managed
- Jupyter Notebook
- Julia REPL
  - Run, Evaluate, Print, Loop
  - Interactive
  - Searchable history, tab-completion, keybindings, dedicated help and shell modes

More information: https://hprc.tamu.edu/kb/Software/Julia/

Accessing the HPRC ACES Portal



HPRC webpage: hprc.tamu.edu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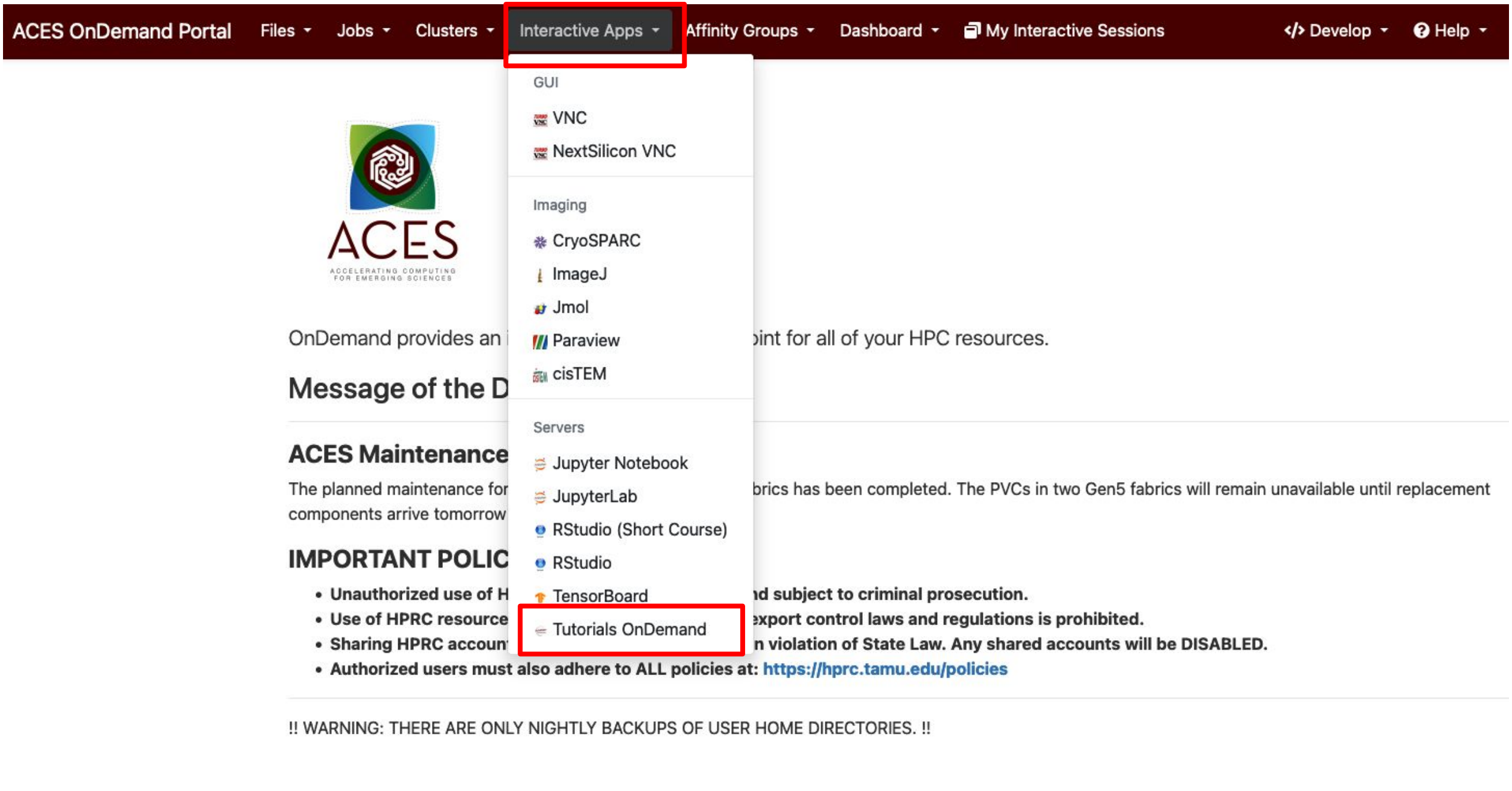
Run the following commands to install the necessary packages:

```
$ mkdir $SCRATCH/.julia
$ ln -s $SCRATCH/.julia
$ module load Julia/1.11.4-linux-x86_64
$ julia
julia> ]
(v1.10) pkg> add IJulia
(v1.10) pkg> add PrettyTables
(v1.10) pkg> add Plots
(v1.10) pkg> add CSV
(v1.10) pkg> add XLSX
(v1.10) pkg> add DataFrames
(v1.10) pkg> add StatsPlots
```

Press backspace to exit the pkg manager and type exit() to quit Julia.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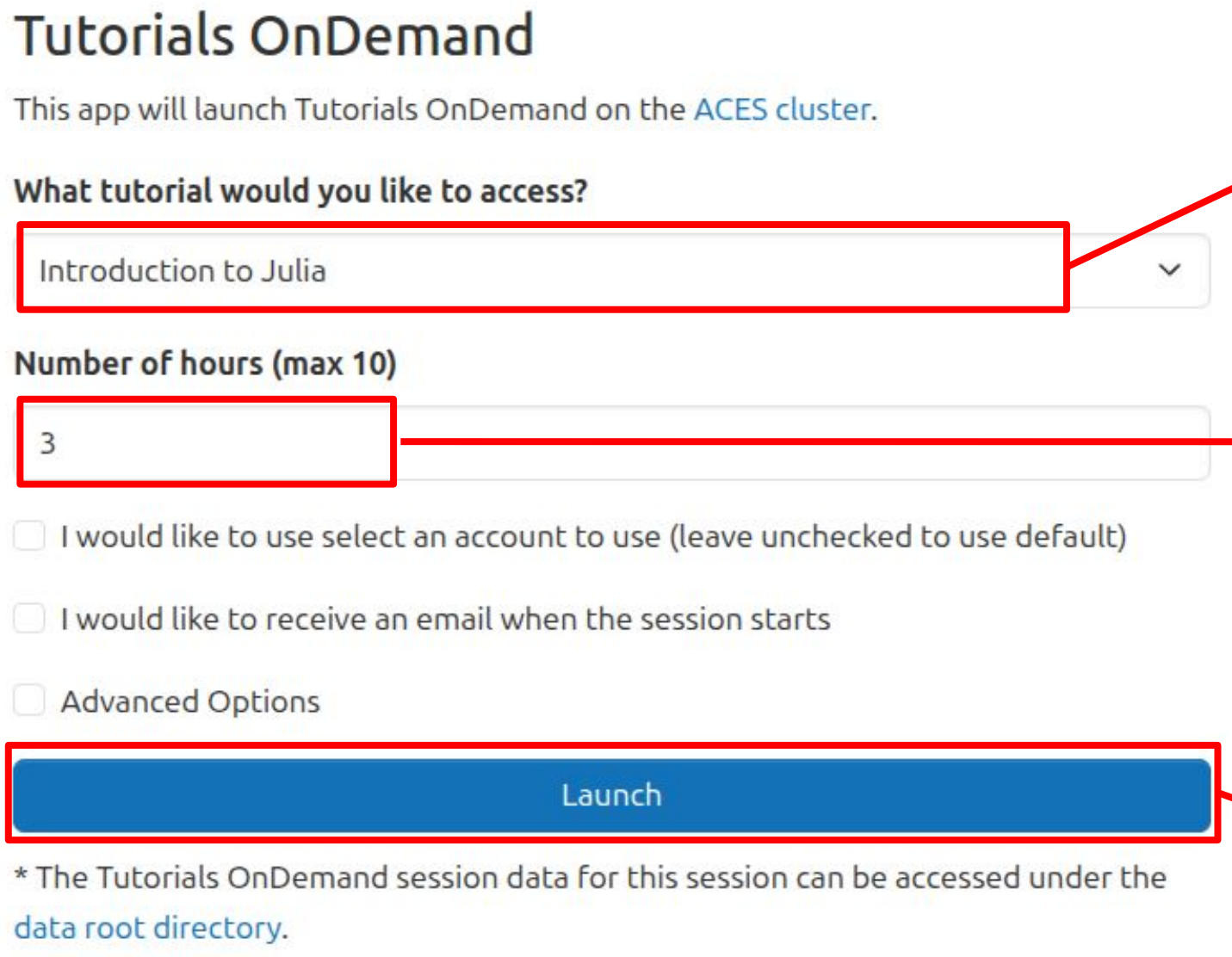

Select “Introduction to Julia” from the dropdown menu

Set number of hours to 3

Click “Launch”

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Host: >_ac009

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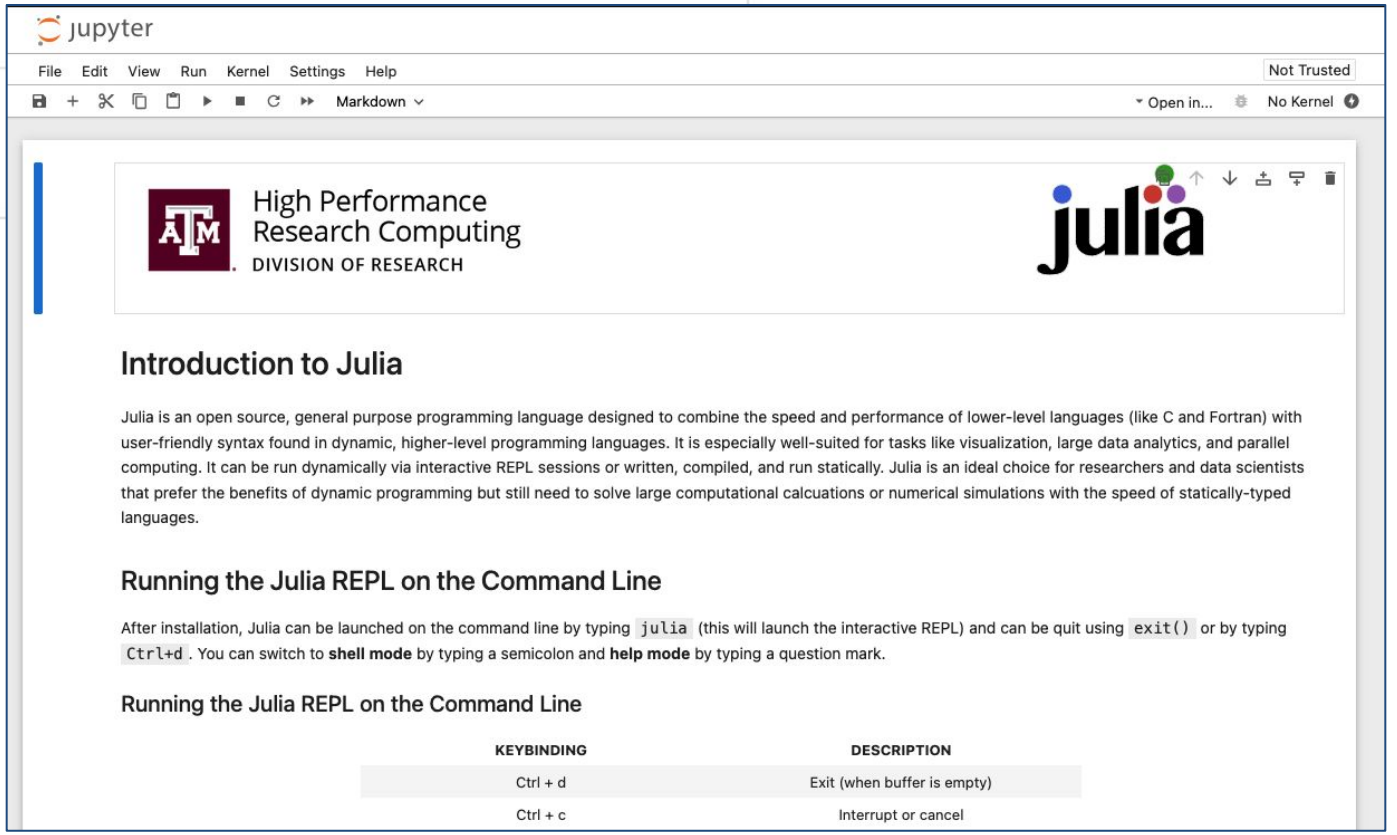
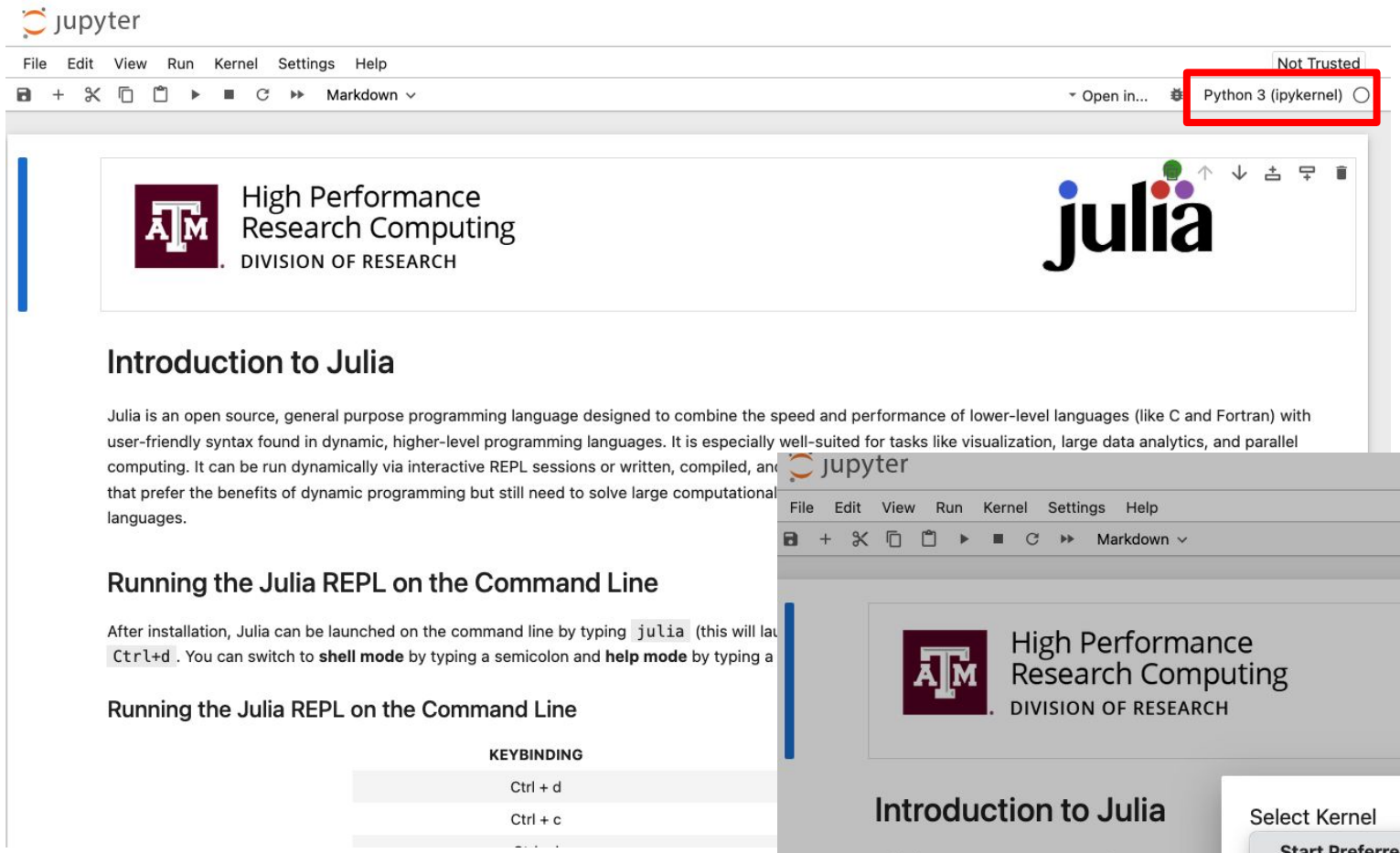
Created at: 2024-10-28 09:04:21 CDT

Time Remaining: 2 hours and 57 minutes

Session ID: bc632df9-70c2-43b8-a9a9-6fa03546a5fa

Connect to Tutorials OnDemand: Introduction to Julia

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File Edit View Run Kernel Settings Help
Not Trusted
Markdown
Open in...
Python 3 (ipykernel)
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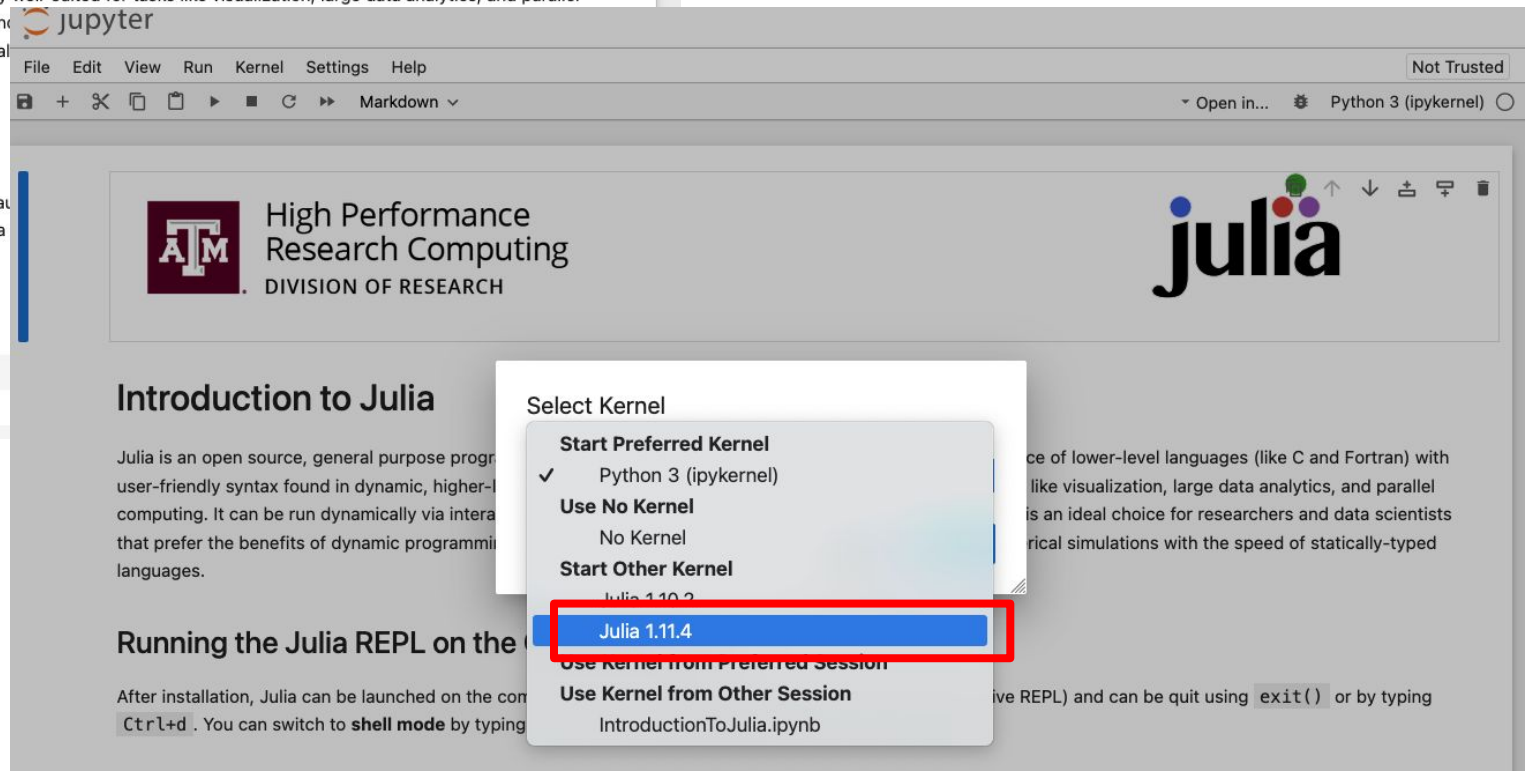
julia
Introduction to Julia
Julia is an open source, general purpose programming language designed to combine the speed and performance of lower-level languages (like C and Fortran) with user-friendly syntax found in dynamic, higher-level programming languages. It is especially well-suited for tasks like visualization, large data analytics, and parallel computing. It can be run dynamically via interactive REPL sessions or written, compiled, an
that prefer the benefits of dynamic programming but still need to solve large computational
languages.
Running the Julia REPL on the Command Line
After installation, Julia can be launched on the command line by typing julia (this will lau
Ctrl+d . You can switch to shell mode by typing a semicolon and help mode by typing a
Running the Julia REPL on the Command Line
KEYBINDING
Ctrl + d
Ctrl + c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Introduction to Julia
Select Kernel
Start Preferred Kernel
Python 3 (ipykernel)
Use No Kernel
No Kernel
Start Other Kernel
Julia 1.11.4
Use Kernel from Other Session
IntroductionToJulia.ipynb
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is an ideal choice for researchers and data scientists
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