ACES: Fundamentals of R Programming

HPRC Training

26 September 2023
Acknowledgements

This short course is sponsored in part by the CCSN Community Engagement Program Travel Award. We gratefully acknowledge their support in providing this community resource.

CSSN Community Engagement Program

CCEP

Please submit by October 1 for SC23

CCEP Travel Rewards Program

CCEP (CSSN Community Engagement Program) gives travel rewards to ANYONE for community engagement, feedback forums, documentation and much more!

Submissions are reviewed once a month. Please submit by October 1 for SC23 or two months prior to the conference that you desire to attend.
Course Outline

1. Accessing ACES
2. Launching RStudio
3. R as a calculator
4. Data types
5. Variables
6. Matrices
7. Data Frames
8. Importing/Exporting Data
9. Data Visualization
Accessing the HPRC ACES Portal

HPRC webpage: hprc.tamu.edu
Accessing ACES via the Portal (ACCESS)

Log-in using your ACCESS credentials.

Select the Identity Provider appropriate for your account.
Launching RStudio on ACES
### RStudio version: 2023.06.1-524

This app will launch RStudio using the R_tamu software module on an ACES compute node.

You can install your own R packages directly within RStudio.

<table>
<thead>
<tr>
<th>R version</th>
<th>4.2.2</th>
</tr>
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#### Number of hours (max 168)

- Set number of hours to **7**

#### Number of cores (max 96)

- Set number of cores to **1**

**Total GB memory (max 480)**: 12

**Email**:

- Email address must be provided if the checkbox for email notification is checked (see below).

**Slurm account (optional)**:

- This field is needed only if you want to use a different account other than your default account. Leave it blank if you don't know what to provide.

**Launch**

- Click “Launch” once the correct parameters have been selected

*The RStudio session data for this session can be accessed under the data root directory.*
Click this button when it says "Connect to RStudio Server" (this will take a minute)
RStudio Interface

**Console**: Allows users to input R commands directly

**Terminal**: Allows shell access to the node

**Plots**: Displays user-generated graphs/figures

**Packages**: Load and install packages

**Help**: Access help pages for functions and packages

**File Browser**: Allows users to interact with file system
Accessing the Course Materials

- Use the terminal tab in the RStudio GUI and run the following commands:

```bash
[user@ac000 ~]$ cp -r /scratch/training/ACES_FundamentalsOfRProgramming/ .
[user@ac000 ~]$ cd ACES_FundamentalsOfRProgramming
[user@ac000 ~]$ ls
```

The output should read:

```
ACES_FundamentalsOfR.Rmd  king_county_house_data.csv
```
Accessing the Course Materials

- Next, in the upper left corner, select File > Open File
Accessing the Course Materials

- Navigate to the ACES_FundamentalsOfRProgramming directory and select “ACES_FundamentalsOfR.Rmd”
Accessing the Course Materials

- Select “Run Document” from the toolbar to launch the workbook.
Accessing the Course Materials

- If you see a dialog box that says “Popup Blocked” click “Try Again” and the workbook should open in a new tab.
Transition to Workbook

R as a calculator

In its simplest form, R can be used as a calculator (although it can do so much more!). Let’s get started in R by doing some basic arithmetic!

Arithmetic Operators

- Addition: `+`
- Subtraction: `-`
- Multiplication: `*`
- Division: `/`
- Exponentiation: `^`
- Modulo: `%`%

Use the correct operators to complete the equations in the code chunks below.

```R
# Add 12 and 3
```

```R
# Subtract 7 from 11
```
Need Help? Contact the HPRC Helpdesk

Website: hprc.tamu.edu
Email: help@hprc.tamu.edu
Phone: (979) 845-0219

Help us help you -- we need more info

- Which Cluster (ACES, FASTER, Terra, Grace)
- NetID (NOT your UIN)
- Job id(s) if any
- Location of your jobfile, input/output files
- Application used, if any
- Module(s) loaded, if any
- Error messages
- Steps you have taken, so we can reproduce the problem