Seurat-RStudio Hands-On Workshop Guide

What You'll Do Today

In this hands-on session, you will: 1. Set up Docker on your Windows machine 2. Pull a pre-built Seurat-RStudio Docker image 3. Run single-cell RNA-seq analysis in RStudio through your browser 4. Access your data files directly from Windows

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Part 1: Initial Setup (One-Time Only)

Step 1: Install WSL2 (Windows Subsystem for Linux)

1. Open **PowerShell as Administrator** (right-click → Run as Administrator)

2. Copy and paste this command:

   ```
   wsl --install
   ```

3. Press Enter and wait for installation to complete

4. Check wsl –version to see whether installed.

Step 2: Install Docker Desktop

1. Download Docker Desktop from: https://docs.docker.com/desktop/setup/install/windows-install/
2. Run the installer (keep all default settings)
3. **Important**: Make sure **"Use WSL 2 instead of Hyper-V"** is checked
4. Click **Install** and wait
5. **Restart your computer** when installation completes
6. Launch **Docker Desktop** from Start menu
7. Accept the terms and conditions
8. Wait for Docker to fully start (Docker icon in system tray should stop animating)

Part 2: Prepare Your Data

Step 3: Copy Workshop Data to Your Computer

1. Copy the provided workshop data folder to an easy location:

   - Or your Desktop: `C:\Users\<YourUsername>\Desktop\scRNAseq_data`

2. **Remember this path** - you'll need it in Step 5!

3. Your data folder should contain:

```
scRNAseq_data/
├── data/              (count matrices)
├── scripts/           (R analysis scripts)
└── output/
```

Part 3: Pull and Run Docker Container

Step 4: Pull the Seurat-RStudio Docker Image

1. Open **PowerShell** (you can use regular PowerShell, not as Administrator)

2. Copy and paste this command:

```
docker pull ajaxoo7/seurat-rstudio:v2
```

3. Press Enter and wait (this will download ~5-6 GB, may take 5-10 minutes)

4. You'll see download progress bars

5. Check downloaded images:

```
docker images
```

Step 5: Run the Docker Container

Important: Replace `<YourUsername>` with your actual Windows username!

1. In PowerShell, copy this command and **EDIT THE PATH**:

```
docker run -d --name seurat-workshop -p 8787:8787 -v "C:/Users/<YourUsername>/Desktop/scRNAseq_data:/home/rstudio/data" ajaxoo7/seurat-rstudio:v2
```

2. **Example** with real path:

```
docker run -d --name seurat-workshop -p 8787:8787 -v "C:/
        Users/John/Desktop/scRNAseq_data:/home/rstudio/
        data" ajaxoo7/seurat-rstudio:v2
```

3. Press Enter

4. You'll see a long random string (container ID) - this means it worked!

5. **Checkpoint** - Verify container is running:

   ```
   docker ps
   ```

   You should see `seurat-workshop` container listed.

Part 4: Access RStudio

Step 6: Open RStudio in Your Browser

1. Open your web browser (Chrome, Firefox, or Edge)
2. Type in the address bar: **http://localhost:8787**
3. Press Enter

You should see the RStudio login page!

Step 7: Login to RStudio

Enter these credentials: - **Username**: rstudio - **Password**: rstudio

Click **Sign In**

  You're in! You should now see the RStudio interface in your browser.

Quick Reference

Step	Action
1	Install WSL2: `wsl --install`
2	Install Docker Desktop and restart
3	Copy workshop data to Desktop
4	Pull Docker image: `docker pull ajaxoo7/seurat-rstudio:v2`
```

| Step | Action |
|------|--------|
| 5 | Run container with data mounted |
| 6 | Open browser: `http://localhost:8787` |
| 7 | Login: rstudio / rstudio |

**Ready to analyze!**