

# Getting Started with Scientific Programming



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Foundations and Applications of Humanities Analytics

SFI Complexity Explorer

- Overview

- Running code on your home computer

1. Pick a language
  - a. [Python](#), R, Matlab, Java, Julia
2. Set up to work in that language
  - a. Shell
  - b. Install language
  - c. Coding environment
3. Writing and running code

- Picking a language

- Why Python?

- Easy to learn
- Scripting language
  - Data processing, APIs, simulation, machine learning, statistics, plotting
  - Slow, less specialized
- Lots of libraries and resources

### Resources for learning

- [Books](#) and courses
- [Official manuals](#)
- [Tutorials](#)
- [Stack Overflow](#)

## ● Editor

### ○ Text Editor

- Syntax highlighting
- Smart saving
- Productivity tools
- E.g., [Sublime Text](#), Notepad++, Text Wrangler

### Interactive Development Environment (IDE)

- All this plus...
  - Test lines or blocks of code
  - Holds variables in memory
  - Debugging
- E.g., [VS Code](#), Eclipse

## ● Shell

### ○ Telling the computer to do things

- Linux/MacOS (unix-like)
  - Bash, zsh
- Windows
  - PowerShell

Computing pre-GUI

Essential for running scripts, installing software

- Installing Python with Conda

- Conda

- Python management system
- Makes things clean and easy
- Windows, MacOS, Linux

- Jupyter notebooks

- Code notebook for Julia, Python, R  
Excellent for sharing analysis  
Functions like a mini-development environment  
Launch from terminal  
View in browser or IDE like VS Code  
[Install with Conda](#)

- How to Program

- Fake it til you make it

- Learn to search on the internet
  - Describing your problem is key
- [Stack Overflow](#)
  - Questions and answers
  - Syntax, algorithms, aesthetics
- [Programming Manual](#)
  - Language and package documentation
- Tutorials



## ● Running code from shell

- Open terminal/command prompt
- Navigate to the folder containing your script
  - bash: `chdir your/path/here`
  - PowerShell: `Set-Location your\path\here`
- Run the script and look at the output
  - `python3 myscript.py`
- You will have errors
  - Read the line and fix the error
  - Usually syntax (e.g., forgot a parenthesis)
- Edit and repeat

## ● Running Code in IDE

- Open script in IDE
- Press run
- Output in the terminal provided by IDE
  - Same as previous slide
- IDE will “hold your progress”
  - You won’t have to rerun code that already “worked”
  - Stores the variables in memory