Introduction to Computer Programming with Julia

From data analysis and visualization, to machine learning and natural language processing, computer programming is now central to all areas of science and is a skill in ever-increasing demand for researchers. Like learning to cook, computer programming is a skill for life. With a good understanding of the basics, one can hone and develop a proficiency through practice and independent learning. The aim of this course is to deliver the basics of programming and start you on the road to becoming a proficient coder.

The Julia programming language (JuliaLang) is the language of the moment, surging in popularity since its launch in 2012, and set to become one of the most widely used in the next decade. Speed, simple syntax, and a friendly user community are at the heart of Julia. Developed at MIT, Julia is built for researchers by researchers, blending the best elements of R, Python and MatLab together in an easy-to-use environment. Hence, Julia is the optimal language through which to learn the fundamentals of computer programming.

In this course, you will learn about object-oriented programming, how to write algorithms with loops and functions, become familiar with various useful packages for data analysis, and much more.

For more info see:

https://julialang.org/
https://en.wikipedia.org/wiki/Julia_(programming_language)
https://www.nature.com/articles/d41586-019-02310-3

Course Information (TBC)

Instructor	**Dr Matt Flood**
Time	**Thursdays, 16:00 – 18:00**
Duration	**6 Weeks**
Location	**Rm. 345 LIH, Rue Thomas Edison, 1445 Strassen**
Capacity	**20,** ***Open to internal and external participants***
Registration Deadline	**1/February/2022**
Contact	**mailou.faiture@lih.lu // matthew.flood@lih.lu**
Other Details	**This course follows an interactive, hands-on approach where participants write and run computer code during the class. Thus, course participants must have a laptop with Julia pre-installed. Julia is free to download - https://julialang.org/download.** **Classroom exercises continuously build on material covered week-on-week, so full attendance is necessary.** **A short exam will be given at the end of the course.**

Syllabus †

Week 1: *Introduction to Julia*

- Why learn Julia?
- The Julia REPL
- Installing packages
- Pluto

Week 2: *File Format, Object Types, Plotting*

- Julia file format and modules
- Basic object types
- Collections and data structures
- Plotting 101

Week 3: *Control Flow*

- *For* loops, *while* loops and the bang(!) operator
- Conditional (*if-else*) statements
- *Try-Catch* statements
- User input

Week 4: *Functions and Object-Oriented Programming*

- What is a function?
- Function arguments
- What is a composite type (*Struct*)?
- *Struct* methods

Week 5: *Math in Julia*

- Relationship to MatLab and Numpy
- Important math packages
- Statistics 101
- Vector/Matrix operations

Week 6: *DataFrames.jl*

- Relationship to Pandas and R
- DataFrames 101
- Data visualization

➢ Final exam (1 hour, open-book)

† *To be determined and subject to change*