UC CINCINNATI
CARL H. LINDNER COLLEGE OF BUSINESS

julia

Julia Workshop*

with

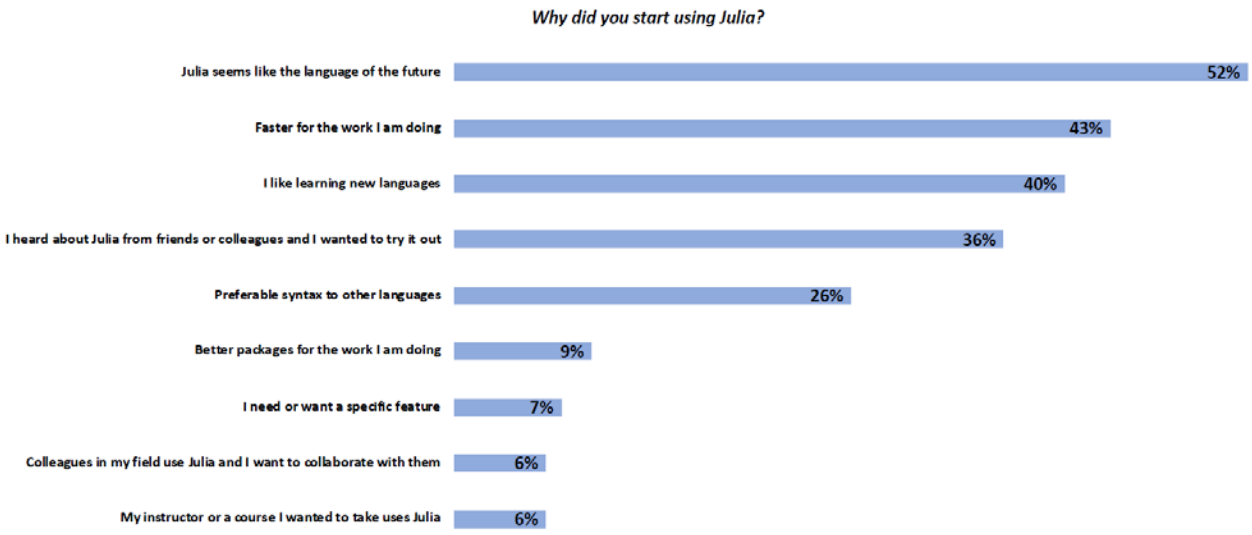
David P. Sanders

UNAM and MIT

Dates: Monday, August 19 – Wednesday, August 21

Location: Carl H. Lindner College of Business (come experience the new building!)

David has a lot of experience teaching Julia and giving workshops at all levels. He gave a fantastic Intermediate Julia workshop at JuliaCon 2019 this year, and he has promised to introduce us to some of the really cool things you can do in Julia that makes it "the language of the future":



If you have *any* experience with Matlab, R, python or any other programming languages (C, Fortran, Java, etc.) for data analysis, scientific programming or numerical analysis, you will quickly become familiar with Julia and all that it offers.

Email jeffrey.mills@uc.edu to sign up or if you have any questions.

* Thanks to the Carl H. Lindner College of Business Faculty Development Committee, the Department of Economics, the Yung Family Foundation, the Center for Business Analytics and the Kautz-Uible Research Institute for support.

Schedule

Monday, August 19

9:00am-12:00pm: Getting Started and Introduction to Julia – Jeff Mills, Lindner 1210

This is a pre-workshop session if you are an inexperienced Julia user and would like some additional help getting started. If you have no experience with computer programming, this may be a good time to learn! We will try to move at a reasonable pace, but you will definitely get enough help and learn about resources available (for free) to allow you to continue learning at your own pace. Goals:

1. For new Julia users, getting everything installed on your machine, and becoming familiar with the main user interfaces/editors and packages available that suit your workflow.
2. Get everyone up to speed on basic knowledge and skills, and point to more resources available for learning more and getting help. This will allow us to hit the ground running on Tuesday, with everyone having Julia installed and knowing how to execute commands, etc.

Tuesday August 20

8:30am-10:00am, 10:30am-12:00pm: Julia Workshop – David P. Sanders, Lindner 1210

12:00-1:30pm: Lunch break

1:30pm-2:30pm: Julia Workshop – David P. Sanders, Lindner 1210

- The workshop will continue after lunch to address any “unfinished business”, i.e. finish up the workshop if there is material still to be covered, answer questions, etc.

2:30pm-5:00pm: Lab/Learning/Hackathon, Lindner 1210

- We will meet in the same location for the remainder of the afternoon for self-directed learning and coding in Julia with help from David Sanders, along with Jeff Mills and other participants. **The goal is to get answers to** "how do I do this in Julia?" and "why isn't this working?" questions in a casual, low stress environment. Help one another, work together, or work by yourself with help available at hand.

Wednesday, August 21

10:00am-11:30am: Interval Analysis with Julia – David P. Sanders, Lindner 1210

A seminar talk by David Sanders based on his work developing interval analysis tools in Julia for guaranteed root finding, global optimization, constrained programming, etc. He has authored several Julia packages to implement these methods, for example:

IntervalOptimisation.jl

https://github.com/JuliaIntervals/IntervalOptimisation.jl

This package provides **rigorous global optimisation** routines written in pure Julia, using interval arithmetic provided by the author's IntervalArithmetic.jl package.

IntervalRootfinding.jl

This package provides **guaranteed methods** for finding **roots** of functions, i.e. solutions to the equation `f(x) == 0` for a function `f`.

IntervalConstraintProgramming.jl

This Julia package allows us to specify a set of constraints on real-valued variables, given by inequalities, and **rigorously calculate (inner and outer approximations to) the *feasible set***, i.e. the set that satisfies the constraints.

More information is available at: https://github.com/JuliaIntervals

David P. Sanders:

Professor of Physics, Universidad Nacional Autónoma de México, currently visiting MIT.

Interests: Scientific computing, experimental mathematics, **#julialang**, teacher, viol(in)ist

Research interests: Computational statistical physics and nonlinear dynamics

- Set-valued numerical methods, including interval arithmetic and constraint propagation
- Chaotic and transport properties in dynamical systems, especially billiard models
- First-passage and encounter properties of random walks
- Dynamics in random environments
- Markov chain Monte Carlo simulation methods