

MIT Course 18.S096, IAP 2017  
Performance Computing  
in a High-Level Language

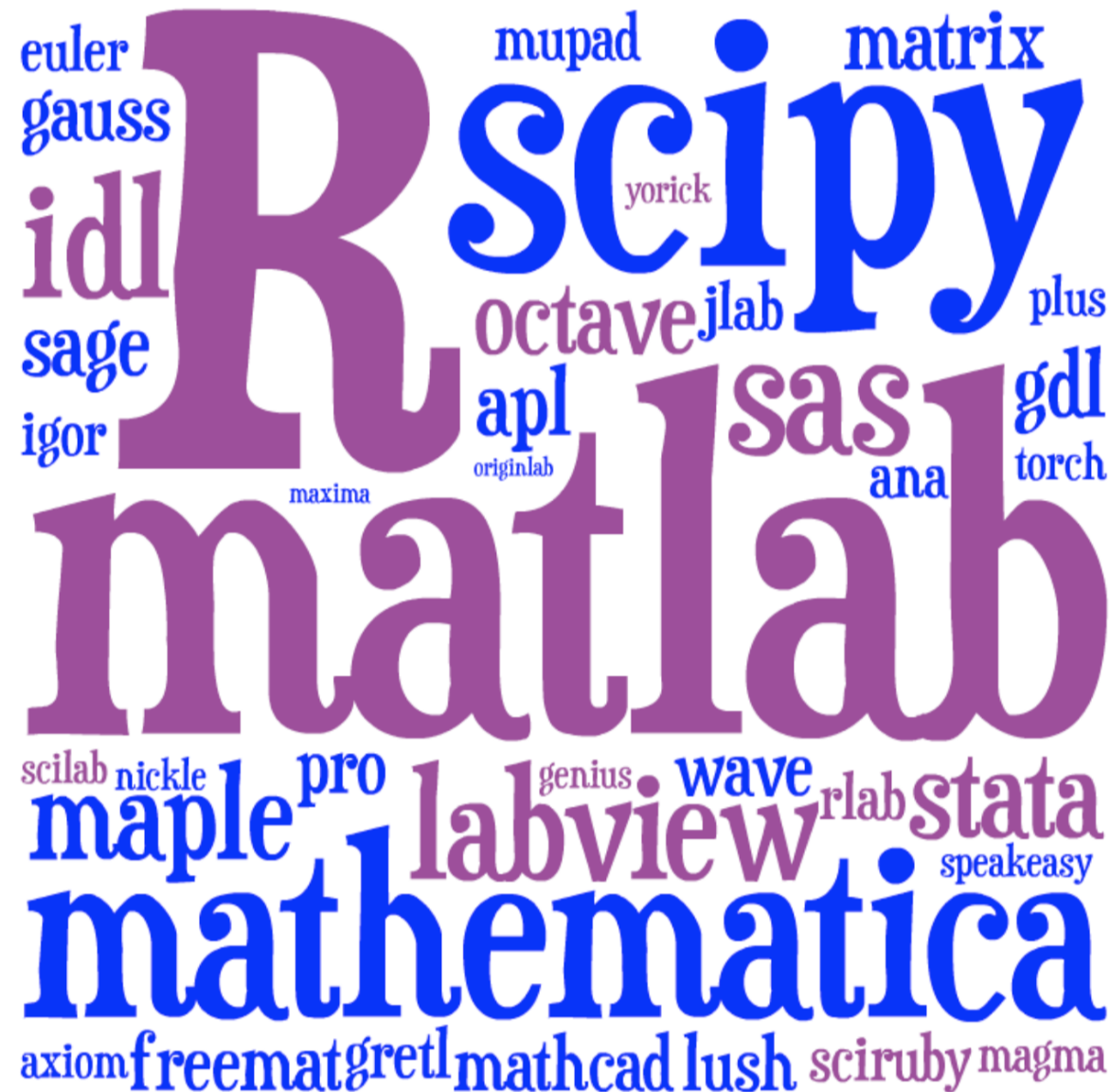
Alan Edelman & Steven G. Johnson, MIT Appl. Math  
David P. Sanders, UNAM  
Jeff Bezanson, Julia Computing

<https://math.mit.edu/classes/18.S096/iap17/>

# Administrivia

- Lectures Tues/Wed/Fri at 2pm
- “Lab” Thursday 2pm: Programming practice
- Weekly psets, due Monday
  - We give you slow code, you give us fast code
  - Token prize (unrelated to grade) for fastest code
- 4 units, A–F grading

Lots of choices for interactive math...



[ image: Viral Shah ]

# Course goals

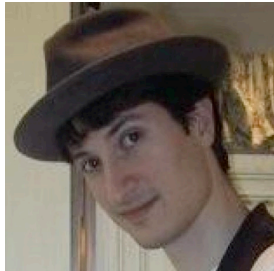
- Understand the connection between the **low-level architecture** of the computer and the performance characteristics of **high-level languages**.
- Learn how to **write and optimize your own performance-critical code**
- Have fun!

# Need a language for all three

- Matlab/Python/R: Too slow
- C/C++/Fortran: Too low-level/insane
- Go/Rust/Haskell: Not interactive enough (statically typed, not dynamically typed)
- ... ?

# A new programming language?

Jeff Bezanson



Viral Shah



Alan Edelman



[ MIT ]



Stefan Karpinski

[ 30+ developers with 100+ commits,  
800+ external packages, 2<sup>nd</sup> JuliaCon in 2015 ]



[ begun 2009, “0.1” in 2013, ~30k commits,  
“0.5” release in Fall 2016 ]

As **high-level and interactive** as Matlab or Python+IPython,  
as **general-purpose** as Python,  
as productive for **technical** work as Matlab or Python+SciPy,  
but as **fast as C**.

# Installing Julia

- *Quick start:* run it “in the cloud”: [juliabox.com](https://juliabox.com)
- Install it **on your own machine:**
  - Download Julia 0.5 from [julialang.org](https://julialang.org)
  - Launch julia
  - Install [IJulia/Jupyter notebook](#) interface

```
ENV[ "JUPYTER" ] = ""  
Pkg.add( "IJulia" )
```

- Run:

```
using IJulia  
notebook( )
```