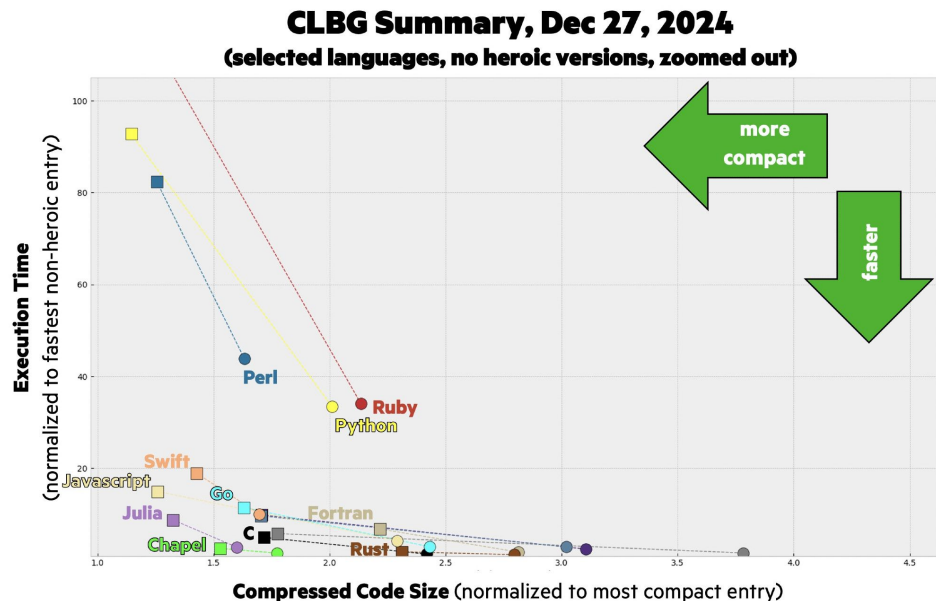# julia for HPC

BoF @ SC25
St Louis – November 20th, 2025

Mosè Giordano (UCL)

What's Julia?

- Free and open-source language created at MIT in ~2009
- v1.0 published in 2018 (v1.12 as of November 2025)
- Compiled language, based on LLVM
- Built-in package manager
- Annual conference since 2014

  (in Germany in 2026)

CLBG Summary, Dec 27, 2024
(selected languages, no heroic versions, zoomed out)

Why Julia for HPC?

Jeff Hammond 🇫🇮 https://c.im/@jeffscience
@science_dot

Replying to @science_dot, @miguelraz_ and @JuliaLanguage

Julia is of course great because it's basically Fortran for people who are too lazy to declare types and has an interpreter.

1:41 pm · 22 Feb 2023 · **1,257** Views

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Why Julia for HPC?

- Designed for "scientific computing" (Fortran-like) and "data science" (Python-like) with **performant kernel code via LLVM compilation**
- Lightweight **interoperability with existing Fortran and C libraries**
- Julia is a **unifying workflow language** with a **coordinated ecosystem**
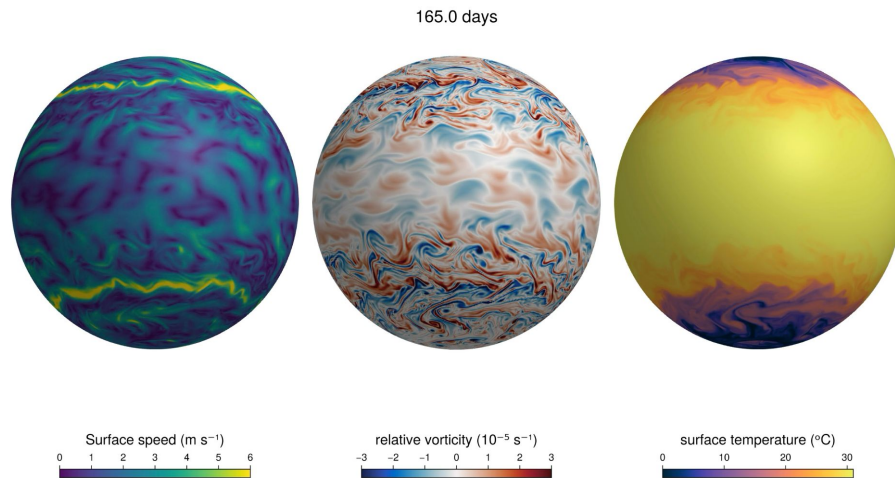
Large scale projects:

- Petascale in 2017 ([Celeste.jl](#))
- Oceananigans ran on ~800 GPUs in 2023 ([arXv:2309.06662](#))
- Oceananigans + Reactant ran on >1000 TPUs in 2025

165.0 days

Surface speed (m s⁻¹)   relative vorticity (10⁻⁵ s⁻¹)   surface temperature (°C)

Katie Hyatt
@kslimes

My port of our research code from CPU-based C++ to GPU-accelerated #julialang is so much faster (1 week -> 1 hour walltimes) and so much easier to add stuff to... it's a nice holiday gift to myself ❄️☀️.

Agenda

- Presentations (~30 minutes):
    - Patrick Diehl (Los Alamos National Laboratory)
    - Philip Fackler (Oak Ridge National Laboratory)
    - Jim Garrison (IBM)
    - Roman Lee (NERSC, Berkeley National Laboratory)
    - David Krasowska (Northwestern University)
- Panel (~30 minutes)
    - Presenters above
    - Raye Kimmerer (NERSC / Princeton)