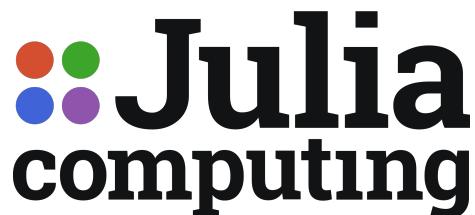


# Learn How to Seamlessly Use Julia for Your Machine Learning Tasks



Dr. Matt Bauman  
Director of Applications Engineering

[www.juliacomputing.com](http://www.juliacomputing.com)

# Learn How to Seamlessly Use Julia for Your Machine Learning Tasks

- Brief introduction to Julia
- Deep dive into a simple machine learning model
- Demo of an advanced ML model

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## Julia in a Nutshell

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### Fast

Julia was designed from the beginning for [high performance](#). Julia programs compile to efficient native code for [multiple platforms](#) via LLVM.

### Dynamic

Julia is [dynamically typed](#), feels like a scripting language, and has good support for [interactive](#) use.

### Reproducible

[Reproducible environments](#) make it possible to recreate the same Julia environment every time, across platforms, with [pre-built binaries](#).

### Composable

Julia uses [multiple dispatch](#) as a paradigm, making it easy to express many object-oriented and [functional](#) programming patterns. The talk on the [Unreasonable Effectiveness of Multiple Dispatch](#) explains why it works so well.

### General

Julia provides [asynchronous I/O](#), [metaprogramming](#), [debugging](#), [logging](#), [profiling](#), a [package manager](#), and more. One can build entire [Applications](#) and [Microservices](#) in Julia.

### Open source

Julia is an open source project with over 1,000 contributors. It is made available under the [MIT license](#). The [source code](#) is available on GitHub.



Jeff Dean (@)  
@JeffDean

Julia + TPUs = fast and easily expressible ML computations!



Keno Fischer @KenoFischer · Oct 23, 2018

Our new paper today: arxiv.org/abs/1810.09868. Compile your #julialang code straight to @Google's #CloudTPU. Must go faster! We'll have an (alpha quality) repo up soon for people to start playing with this.

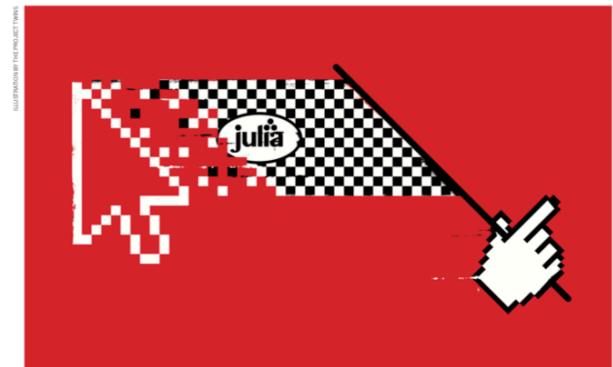
11:23 PM · Oct 23, 2018 · Twitter for Android

# nature

## TOOLBOX

### JULIA: COME FOR THE SYNTAX, STAY FOR THE SPEED

Researchers often find themselves coding algorithms in one programming language, only to have to rewrite them in a faster one. An up-and-coming language could be the answer.



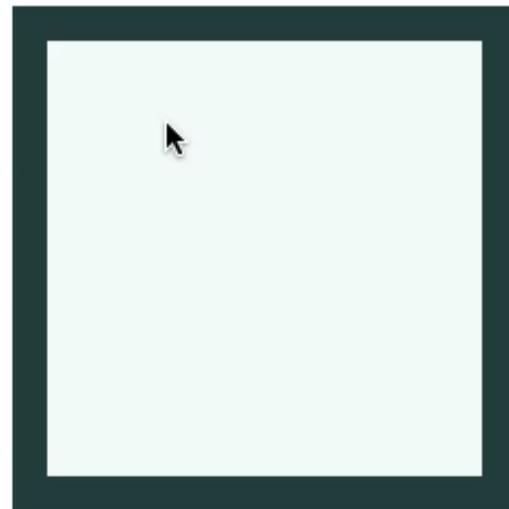
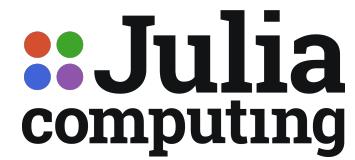
BY JEFFREY M. PERKEL

**W**hen it comes to climate modeling, every computational second counts. Designed to account for air, land, sun and sea — and the complicated physics that links them, these models can run to millions of lines of code, which can be executed on the world's most powerful computers. So when the coder-climatologists of the Climate Modeling Alliance (CliMA) — a coalition of US-based scientists, engineers and mathematicians — set out to build a model from the ground up, they opted for a language that could handle their needs. They opted for Julia.

Giraldo says, and since adopting Julia he has seen an upick in interest. "Some of them are really interested in climate modelling, but others are intrigued by the idea of using Julia for some large-scale application," he says.

Jane Herriman, who is studying materials science at the California Institute of Technology, says she has noticed the same trend. She has tripled her code's speed since rewriting her Python codes in Julia. Michael Stumpf, a systems biologist and self-styled Julia proselytizer at the University of Melbourne, Australia, who has ported computational models from R, has seen an 800-fold improvement. "You can do things in an hour that would otherwise take weeks or months," he says.

AUGUST 2019 | VOL 572 | NATURE | 141



0 1 2 3 4 5 6 7 8 9

Clear

See code



<https://fluxml.ai/experiments/>

# AlphaZero

## Sunday Los Angeles Times



LEE SEDOL, right, plays the ancient Asian board game Go against Google's artificial intelligence program, AlphaGo. Lead programmer Aja Huang sits at left.

### AI makes its next move

A computer's board game victory marks a milestone

By STEVEN BOROWICK  
AND TRACY LIEN

SEOUL — First went checkers, then fell chess. Now, a computer program has defeated the world's top player in the ancient, east Asian board game of Go — a major milestone for artificial intelligence that brings to a close the era of board games as benchmarks in computing.

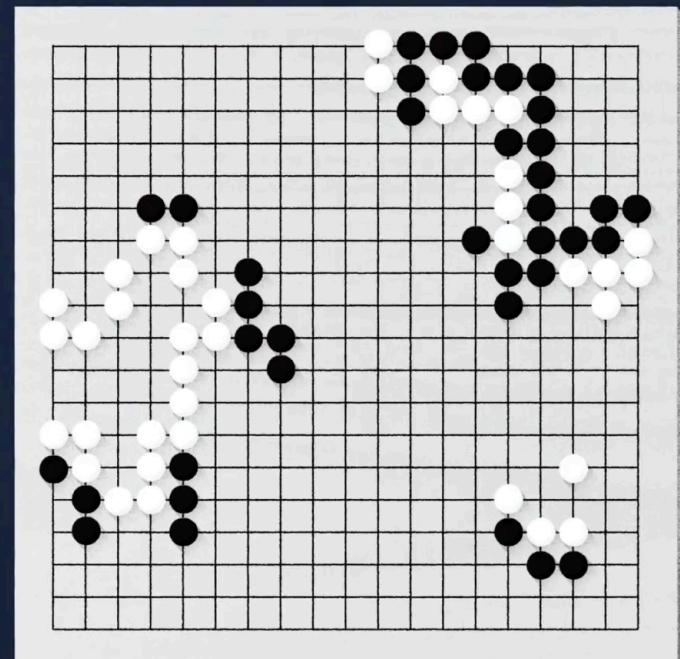
At the Four Seasons Ho-

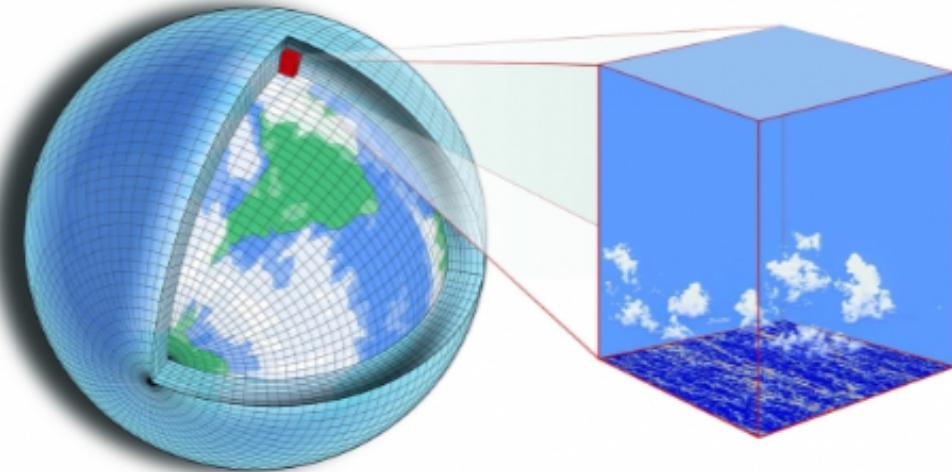
tel in Seoul, Google DeepMind's AlphaGo capped a 3-0 week on Saturday against Lee Sedol, a giant of the game. Lee and AlphaGo were to play again Sunday and Tuesday, but with AlphaGo having already clinched victory in the five-game match, the results are in and history has been made. It was afeat that experts had thought was still years away.

"I have to express my apologies," Lee said, his voice quivering slightly. He seemed just as sad as after his previous two losses earlier in the week, but this time not so surprised.

"I misjudged the capabil-

[See AlphaGo, A4]





## New climate model to be built from the ground up

Scientists and engineers will collaborate in a new Climate Modeling Alliance to advance climate modeling and prediction.

**School of Science**  
December 12, 2018

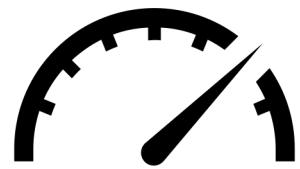




# AlphaZero.jl



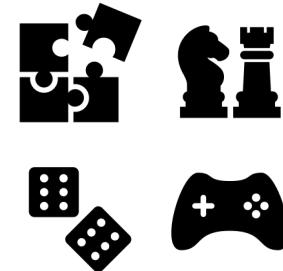
*Simple*



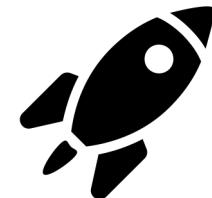
*Fast*



Jonathan  
Laurent  
Carnegie Mellon  
University



*Extensible*



*Built to scale*

demo.juliahub.com/ui/Home

# JuliaHub

beta

Matt Bauman

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JuliaTeam v2.1.0-juliahub

## JuliaHub

Track the pulse of the Julia ecosystem, find the packages you use, and discover new packages.

Cloud computing is coming to JuliaHub. [Get notified](#) when it's ready.

### Popular Packages

Flux

IJulia

Gadfly

Gen

DifferentialEquations

Knet

JuMP

Plots

Genie

### # Popular Tags

image-processing      data-structures  
time-series      finance  
data-science      economics      neural-networks  
astronomy      deep-learning      regression  
differentialequations      plotting  
biology      math      nlp      bioinformatics  
mlj      mcmc      ode      statistics      queryverse  
flux      dae  
**machine-learning**  
data      optimization      sde      geo  
flux      simulation  
gpu      differential-equations  
dde  
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linear-algebra      bayesian-inference

# JuliaHub

beta

Matt Bauman

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JuliaTeam v2.1.0-juliahub

## PREVIOUS RUNS

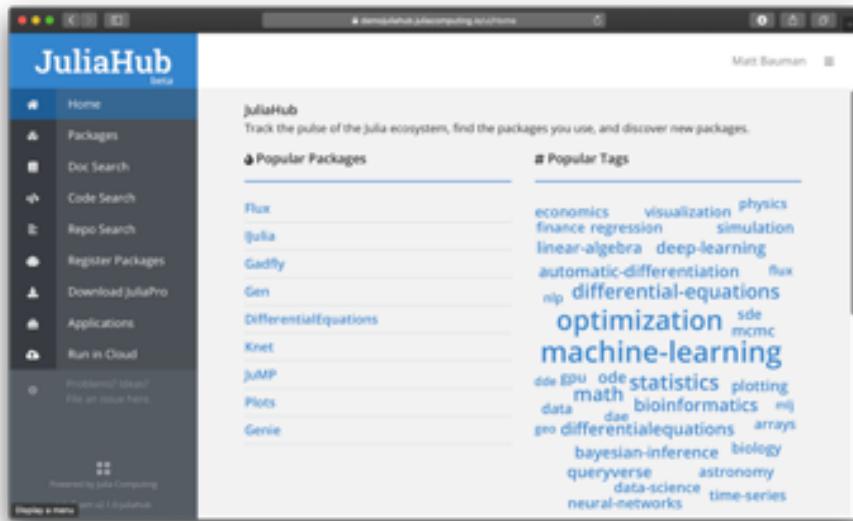
Job Status: █ Completed █ Submitted █ Running █ Failed █ Stopped

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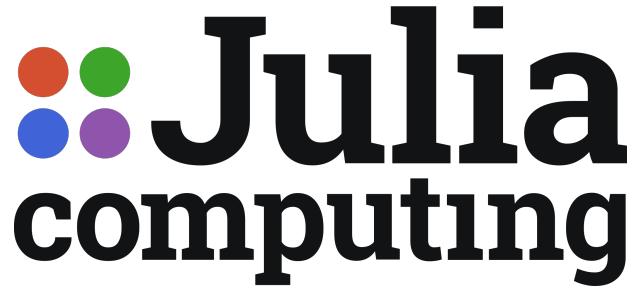
Timestamp	Job ID	Branch/Tag	Git Tree SHA	Job Status	gpu	workers	memory
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Compare



is available for enterprise use

- Private package and registry management
- Deployment behind firewalls and airgaps
- Governance and security
- Deploy into your own AWS account/subnet



10:30 AM GMT

**Training and Deploying ML Models in**

The logo for the Julia programming language. It consists of the lowercase word "julia" in a bold, black sans-serif font. Above the letter "j", there are three small colored circles: a blue circle on the left, a red circle in the middle, and a green circle on the right.

**julia**

In This Workshop:

- We go over the basics of Julia syntax
- We form a baseline for ML concepts
- We apply them using Flux
- We scale them to real world models
- And demonstrate large novel workflows at scale at high performance