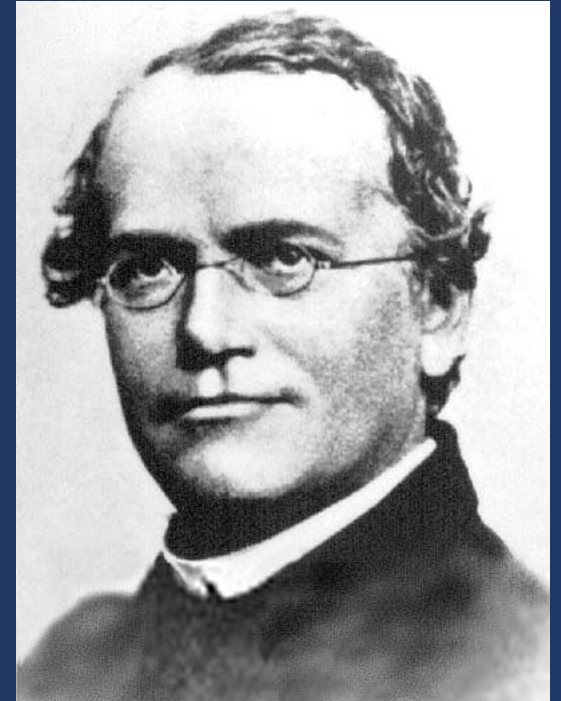


ASHG 2020 OpenMendel Workshop



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History of Mendel Software

1. The first version of Mendel was created more than 25 years ago. It was originally written in Fortran 77 and distributed in source code of about 4,000-5,000 lines.
2. Classic Mendel was later rewritten in Fortran 2003 and distributed in executable form with yearly updates. It has many more options and reasonable but outdated input and output choices. Classic Mendel is maintained as legacy software.
3. Classic Mendel is burdened by complex memory management, 75,000 plus lines of hard-to-digest code, and virtually no access to modern libraries for graphing, linear algebra, optimization, and statistics.

The OpenMendel Project

1. The aim is to turn Mendel into open source and foster a community of software developers.
2. Written in Julia, OpenMendel allows for more rapid prototyping of new computational methods, better graphics, better parallelization, and better integration with existing bioinformatics software.
3. By storing data on the bit level and coordination of its working parts, it can handle large modern datasets in an integrated analysis pipeline.

The Choice of the Julia Software Language

1. Julia is viewed by many as the future of scientific programming. It is technically superior to R and Matlab, free and easy to download, loaded with good utilities for big data analysis, and oriented to a notebook style of statistical analysis.
2. Julia is specifically designed for high-performance numerical and scientific computing. It relies on a just-in-time compiler, so code runs much faster than R or Matlab code. R, Fortran, and C code is callable by Julia. Parallel computing is a major thrust. Julia fosters the writing of compact readable code. Graphics support is weak but improving.

OpenMendel Contributors

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We welcome new collaborators!

Current OpenMendel Options

[*https://openmendel.github.io*](https://openmendel.github.io)

[*https://github.com/openmendel*](https://github.com/openmendel)

VCFTools

SnArrays

MendelImpute

MendelPlots

MendelSearch

MendelBase

MendelGeneDropping

TraitSimulation

MendelEstimateFrequencies

ADMIXTURE

MendelAimSelection

MendelKinship

MendelGeneticCounseling

MendelTwoPointLinkage

MendelLocationScores

MendelGameteCompetition

MendelGWAS

OrdinalGWAS

MendelIHT

VarianceComponentModels

Julia Resources

- *Think Julia: How to Think Like a Computer Scientist* by Ben Lauwens and Allen Downey
<https://benlauwens.github.io/ThinkJulia.jl/latest/book.html>
- *A Deep Introduction to Julia for Data Science and Scientific Computing* by Chris Rackauckas <https://ucidatascienceinitiative.github.io/IntroToJulia>
- *Introducing Julia* at Wikibooks https://en.wikibooks.org/wiki/Introducing_Julia
- *Get Started with Julia*: a collection of tutorials, videos, and other resources
<https://julialang.org/learning>
- Current official Julia documentation <https://docs.julialang.org/en/v1>
- The Julia Language home page, including download links <https://julialang.org>
- *Algorithms from THE BOOK* by Kenneth Lange, published by SIAM in 2020, with all included algorithms coded in Julia