GHIST Genomic History Inference Strategies Tournament

To be prepared to follow along…

mailing list

1) Visit https://www.synapse.org/ and click on Register Now in the upper-right corner to create an account. Linking an existing Google account is easy.

2) Once you have an account, you'll need to become a Synapse certified user to submit to challenges. To do so, you'll need to take a short quiz: https://www.synapse.org/Quiz:ghist . The answers are provided in the (?) to the right of each question.

GHIST

Genomic History Inference Strategies Tournament

Organizer: Ryan Gutenkunst

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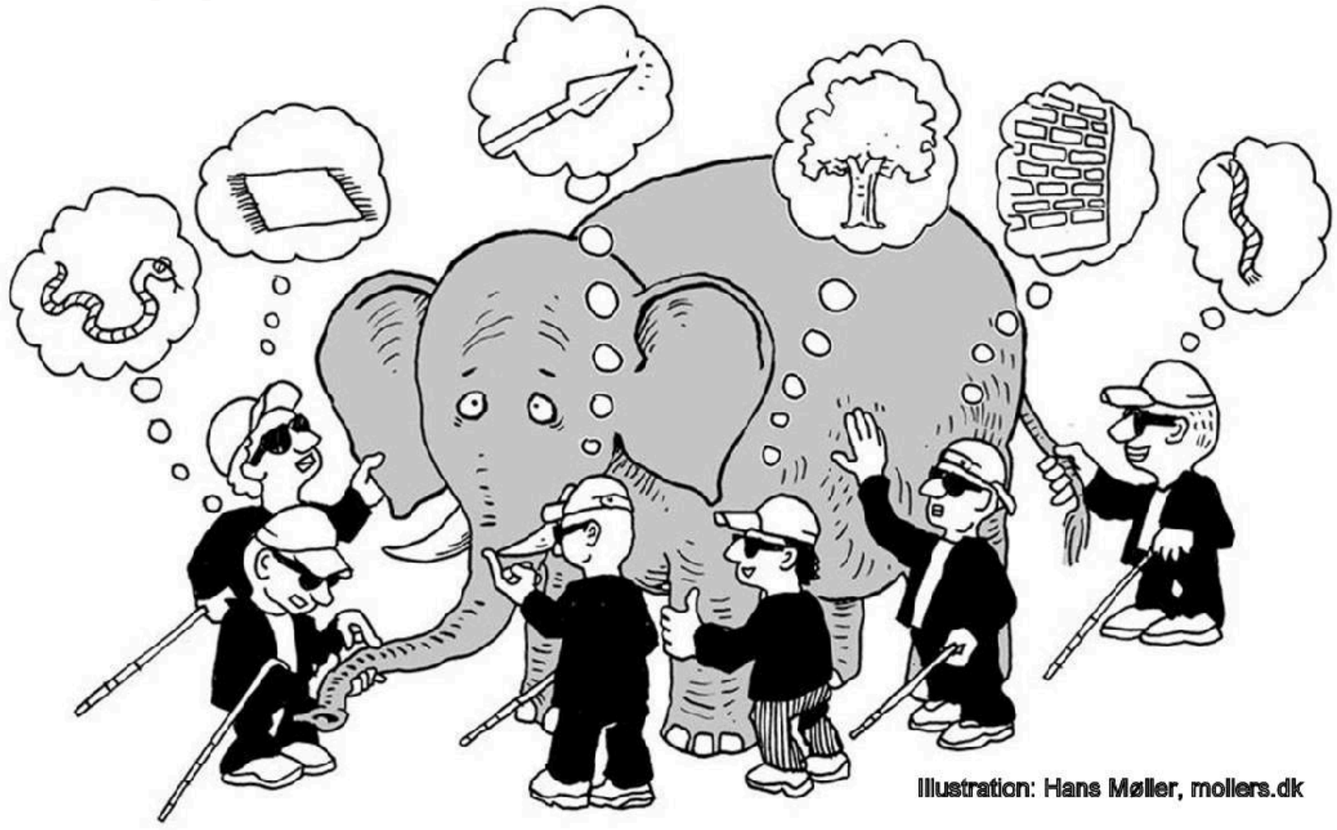


http://ghist.bio

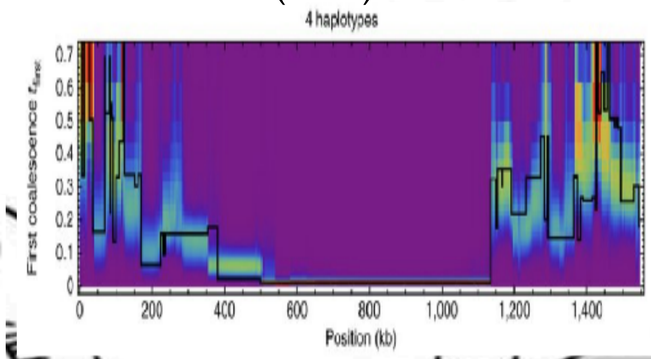
mailing list

NIH NIGMS

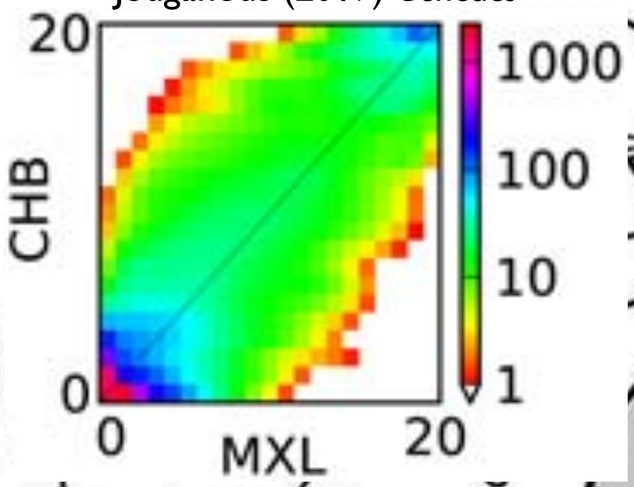
ARIZONA

Population genomic inference

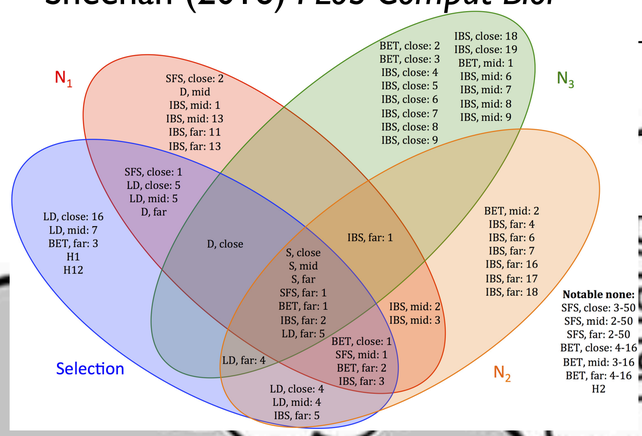
Schiffels (2014) *Nature Genet*



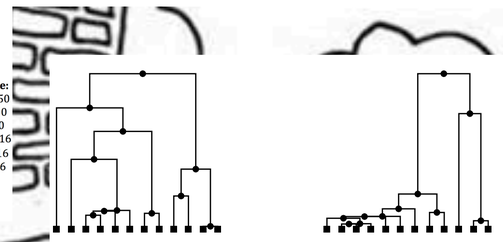
Gutenkunst (2009) *PLoS Genet*
Jouganous (2017) *Genetics*



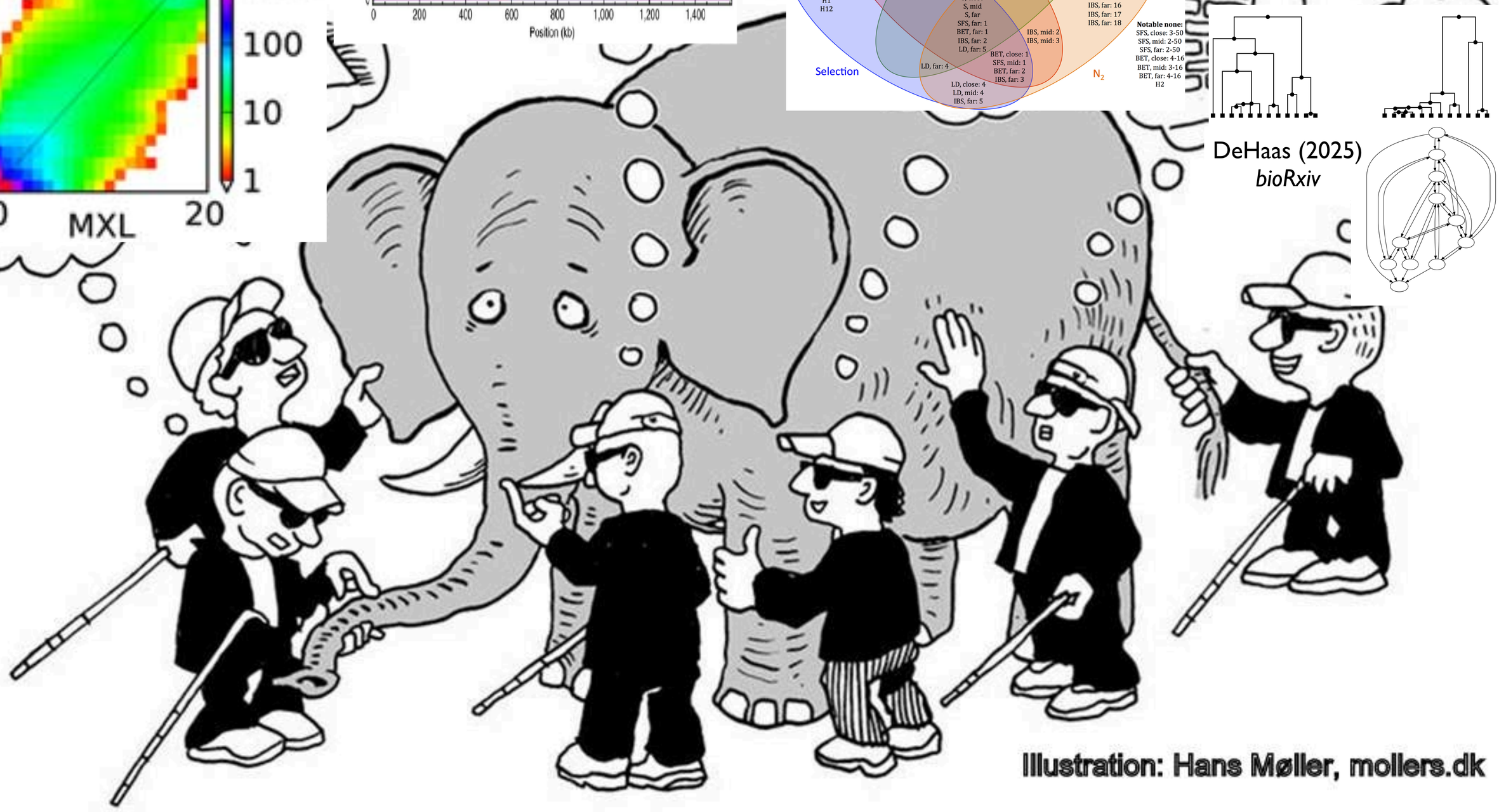
Sheehan (2016) *PLoS Comput Biol*



Flagel (2018) *Mol Biol Evol*

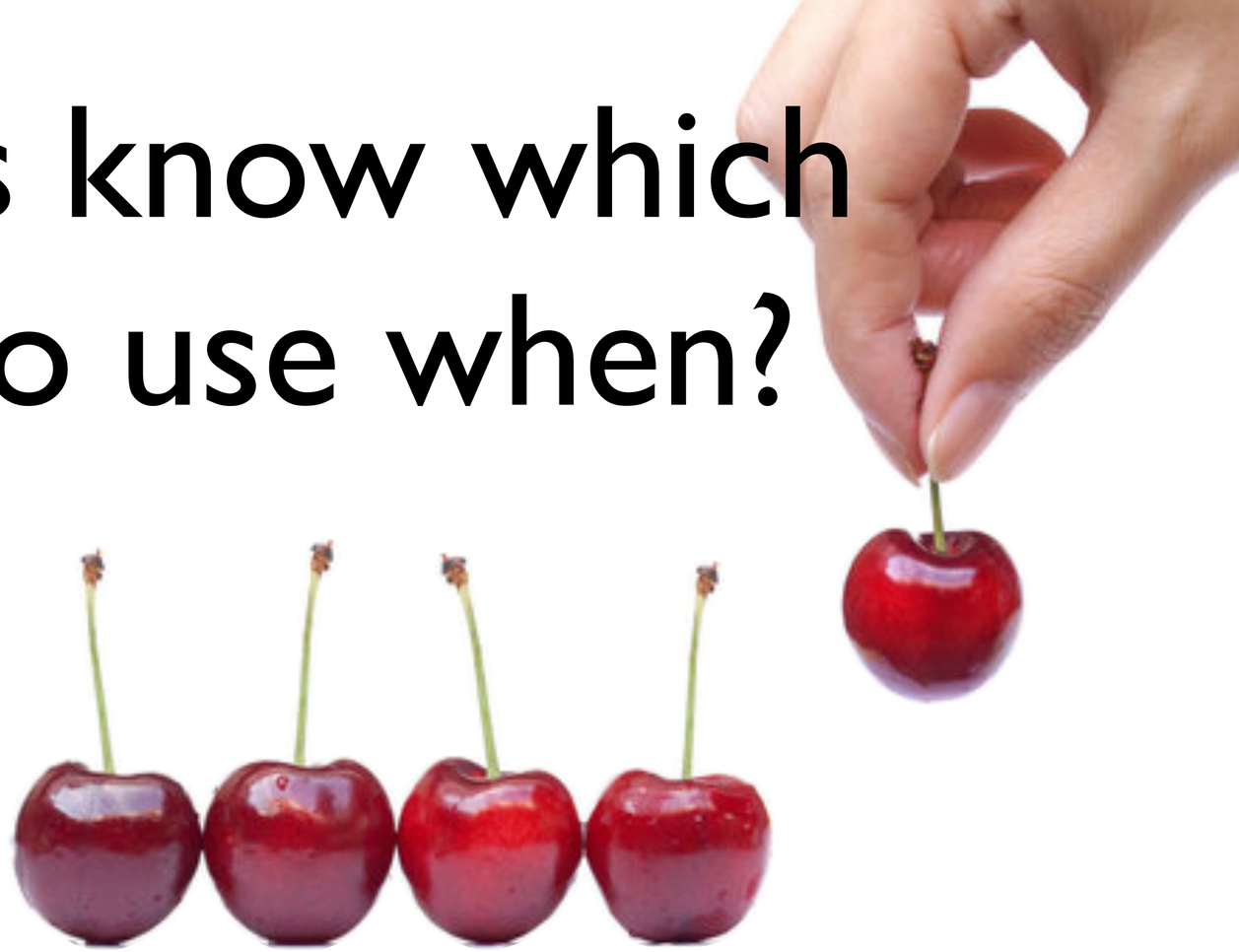


DeHaas (2025)
bioRxiv



(Metaphor suggested
by Richard Durbin)

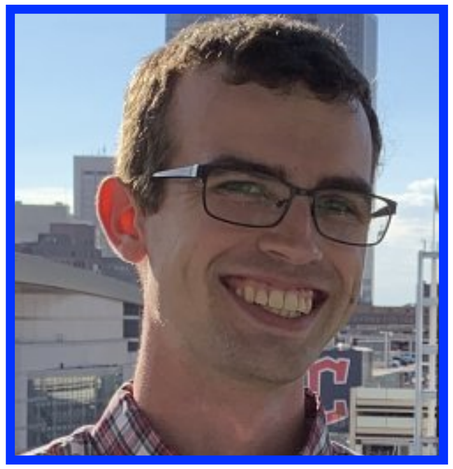
How do users know which approaches to use when?

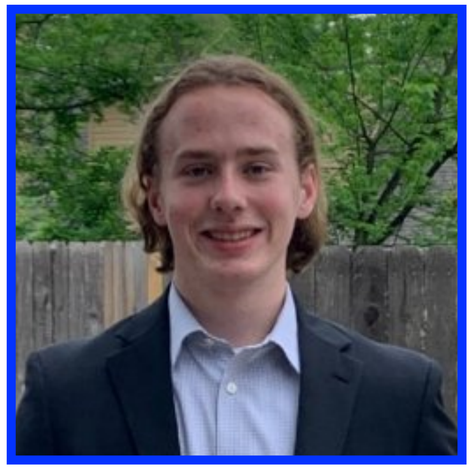


Benchmarks by methods developers may be unconsciously biased

Solution?
Engage the community
Hide the truth

- Organizers create challenges by simulating data from various population genetics scenarios
- Competitors in a challenge to infer aspects of the scenario, using any approach they choose
- Competitors submit brief writeups of their approaches
- Top competitors invited as co-authors and awarded cash prizes




GHIST 2024: The First Genomic History Inference Strategies Tournament

Travis J. Struck [1,†] Andrew H. Vaughn [2,3,†] Austin Daigle [4,5] Dylan D. Ray [5]
Ekaterina Noskova [6,7] Jaison J. Sequeira [8] Svetlana Antonets [9]
Elizaveta Alekseevskaya [10] Elizaveta Grigoreva [11] Evgenii Raines [12,13]
Eilish S. McMaster [14] Toby G.L. Kovacs [14] Aaron P. Ragsdale [15]
Andrés Moreno-Estrada [16] Katie E. Lotterhos [17] Adam Siepel [18] Ryan N. Gutenkunst [1,*]

Molecular Biology and Evolution, 2025, **42**, 1–9
https://doi.org/10.1093/molbev/msaf257




SageBionetworks

SYNAPSE

GHIST 2025

- Five demographic history inference challenges, including two with background selection
- Four positive selection detection challenges, including two with background selection
- Error-free simulated data provided as VCF files
- For each challenge, multiple submissions allowed for testing, single submission for final data

Andy Kern

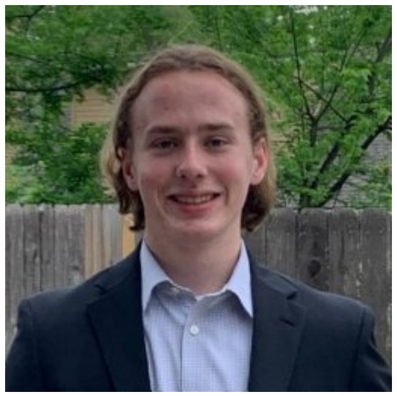
Silas Tittes

Nate Pope

GHIST 2025

- Competition ran from June 16 to Dec 1
- A few highlights:
  - Stephen Rong won four challenges using Relate + gLike for demographic history inference and a composite of many statistics for sweep detection.

  - Austin Daigle won two challenges using neural nets trained on a variety of summary statistics.



  - Alexander Mackintosh won the growth with background selection history inference challenge using his new method based on a windowed SFS: Mackintosh et al. Mol Biol Evol (2026).

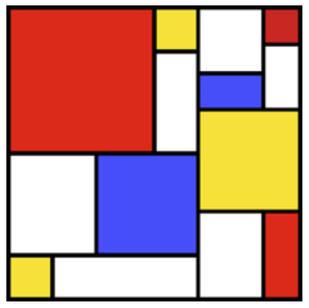
GHIST 2026

- Four demographic history inference challenges, including two with background selection
- Four positive selection detection challenges, including background selection and a soft sweep
- Four relatedness inference challenges, including founder effects and complex pedigrees
- Live today! Runs to Nov 20.

PopSim



ms prime

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Mylène Gagnon

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GHIST

Genomic
History
Inference
Strategies
Tournament

WE NEED YOU!

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