

Opportunities in biomedical data science

Karl Broman

Biostatistics & Medical Informatics, UW–Madison

kbroman.org

github.com/kbroman

@kbroman@fosstodon.org

Slides: bit.ly/srop2023

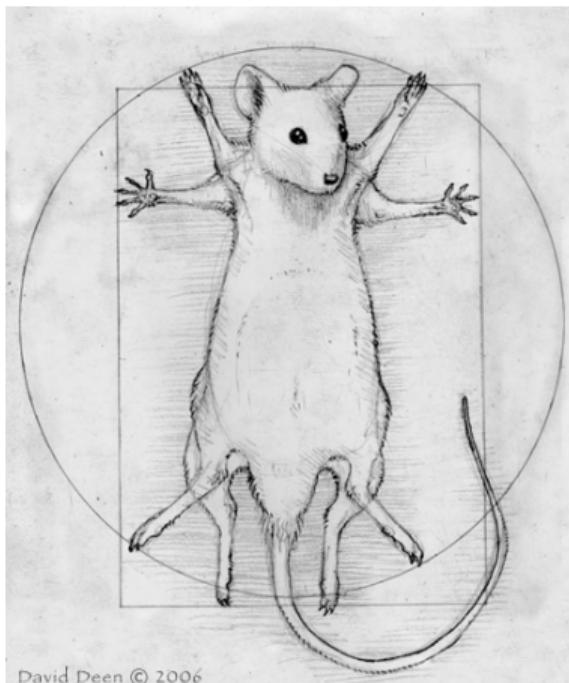
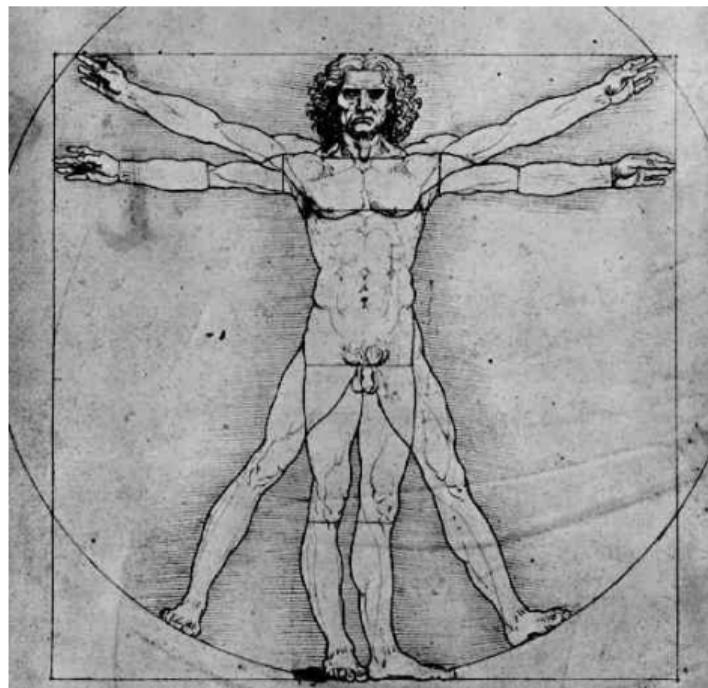
Biomedical data explosion

- ▶ Electronic health records (EHR)
- ▶ Imaging
- ▶ Genome/proteome/metabolome/microbiome data
- ▶ Personal activity/health tracking devices

Biomedical data explosion

- ▶ Electronic health records (EHR)
- ▶ Imaging
- ▶ Genome/proteome/metabolome/microbiome data
- ▶ Personal activity/health tracking devices
- ▶ High-throughput measurements in agriculture and ecology

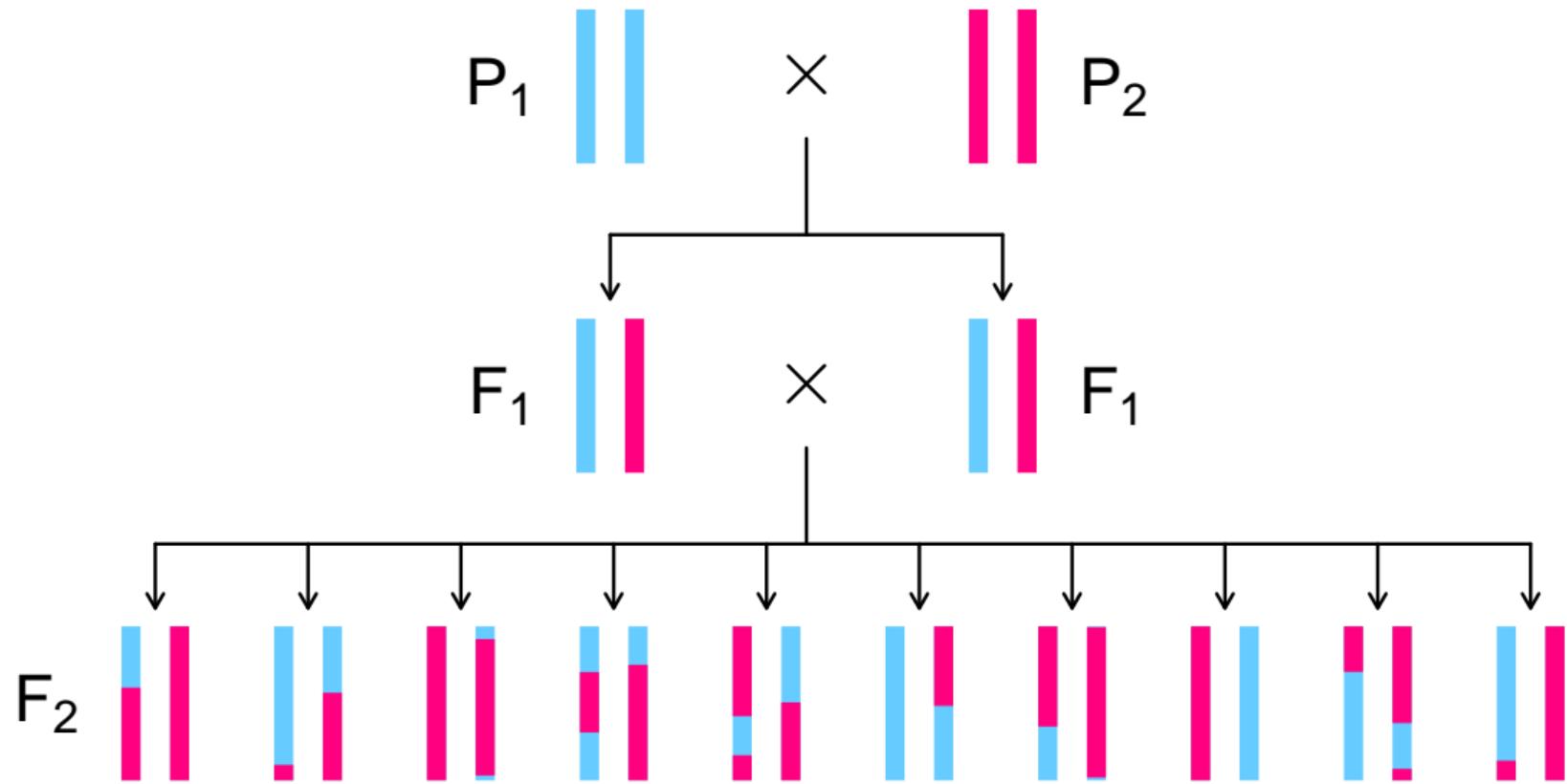




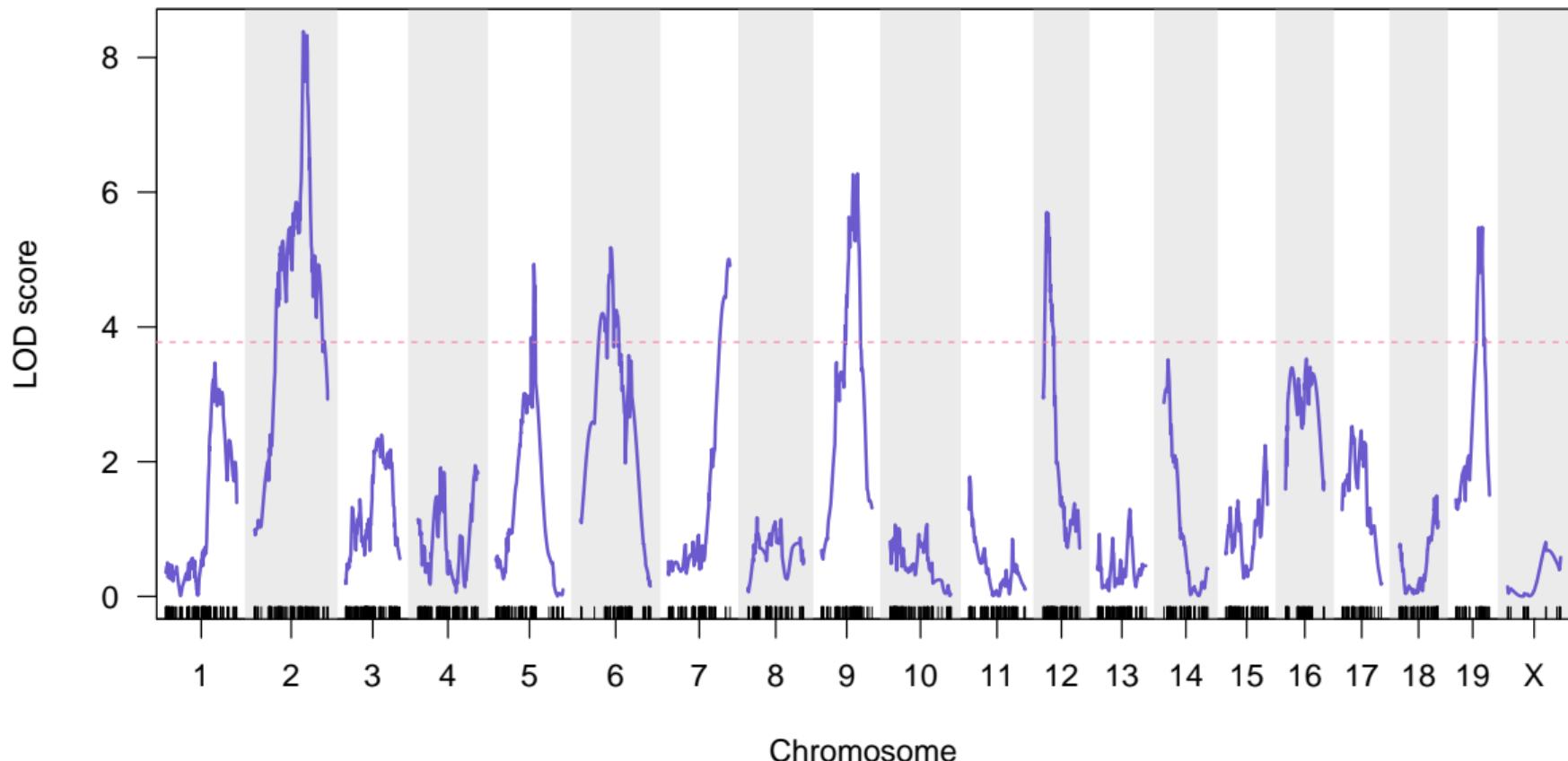
David Deen © 2006

daviddeen.com

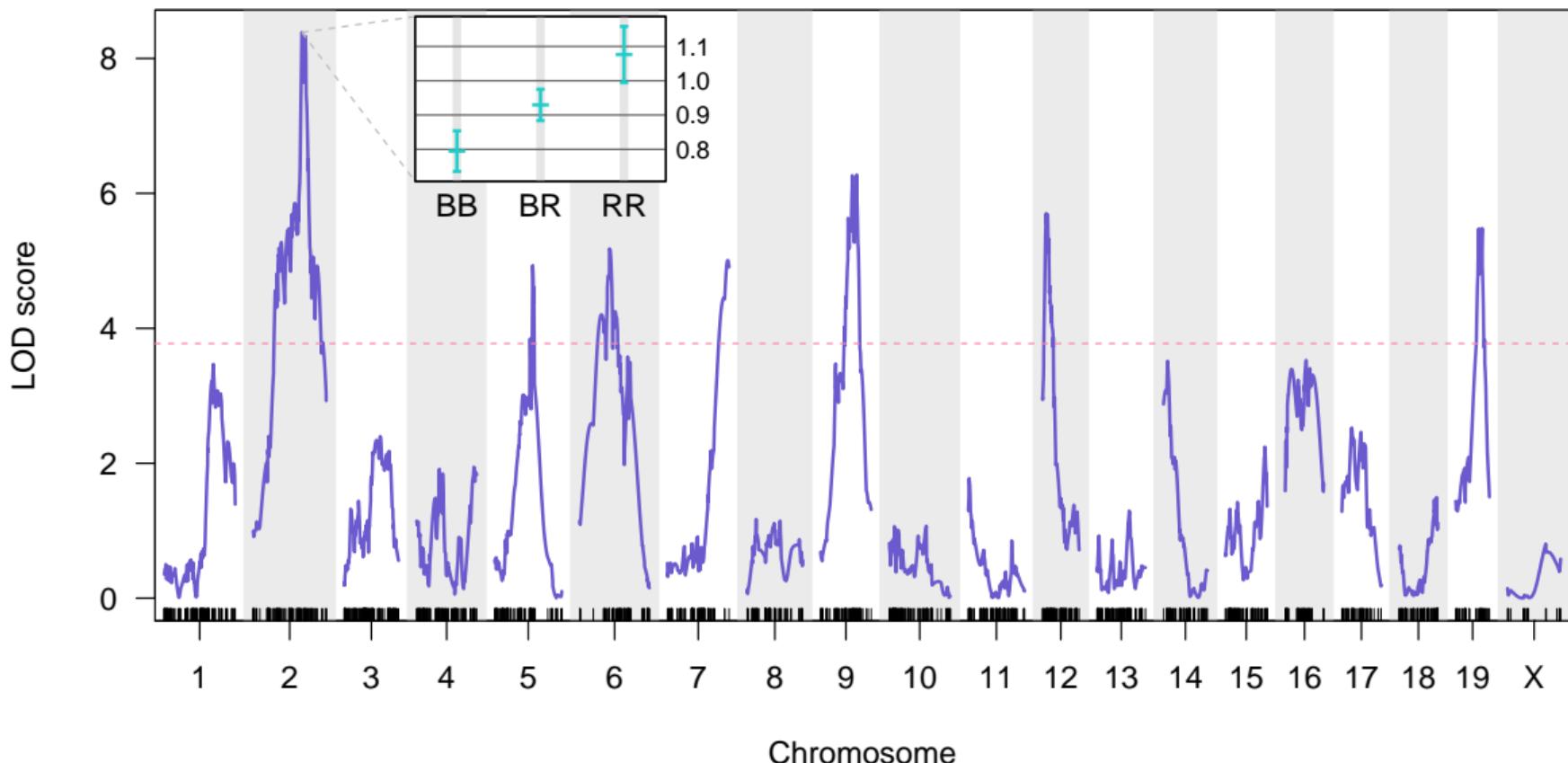
Intercross



Genome scan

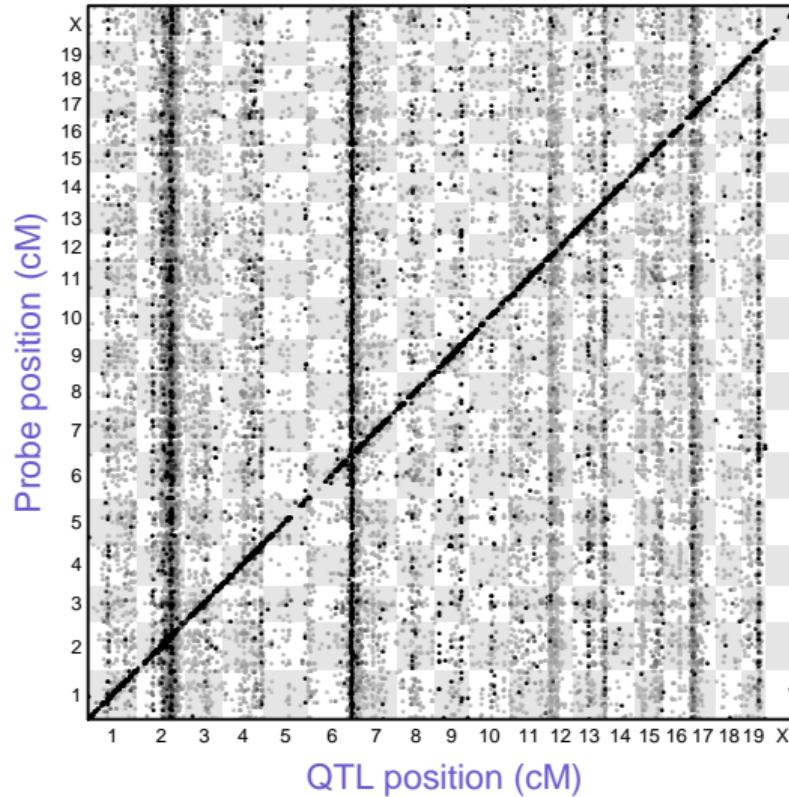


Genome scan

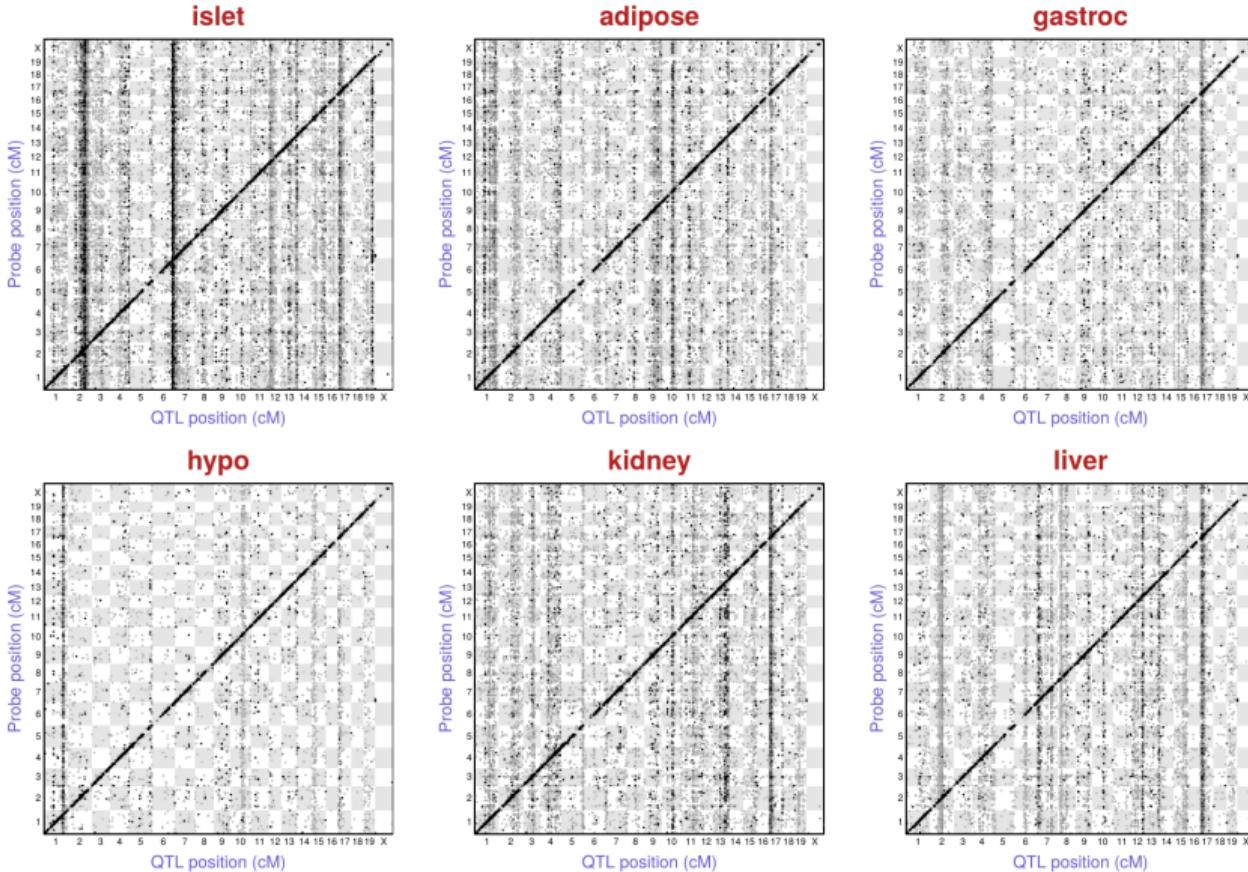


High-throughput phenotypes

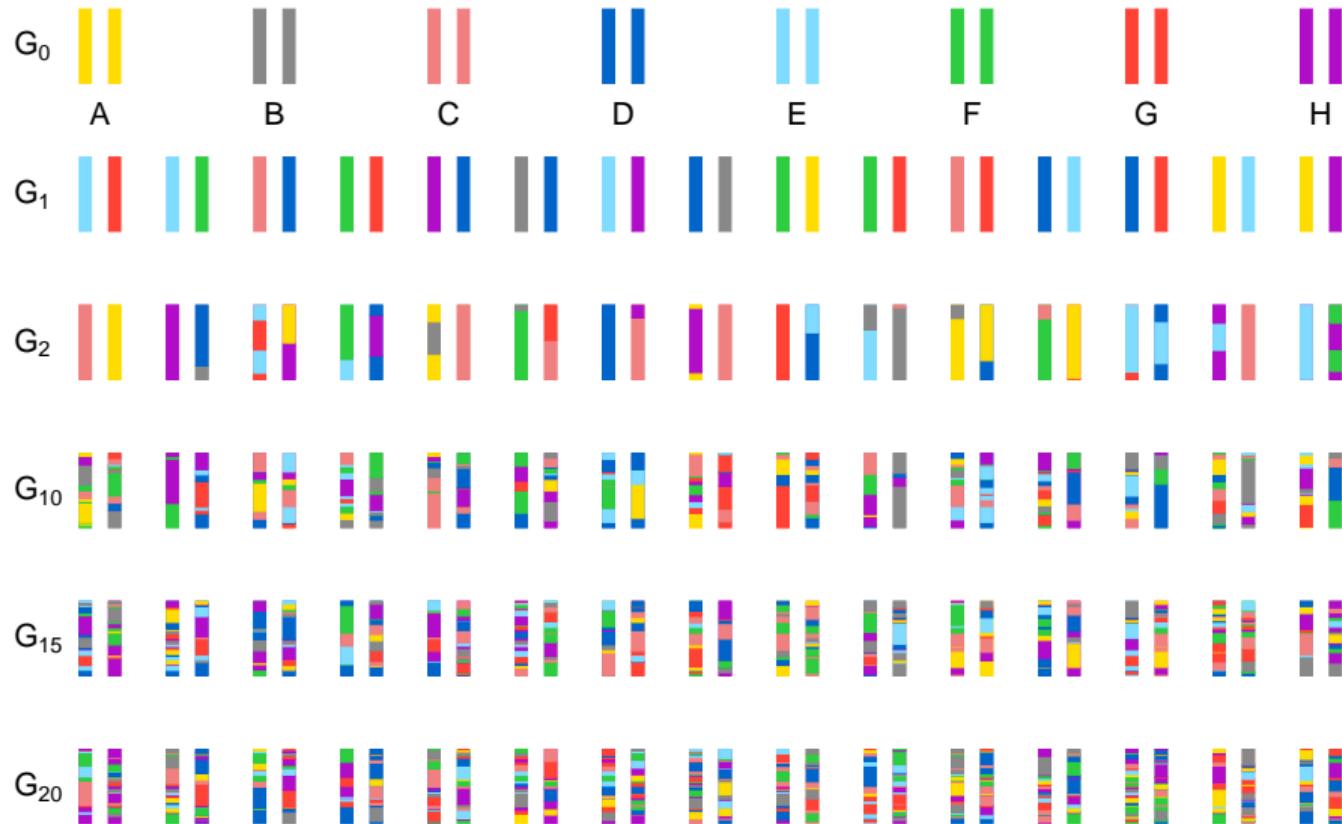
islet



High-throughput phenotypes



Multi-parent crosses



The work

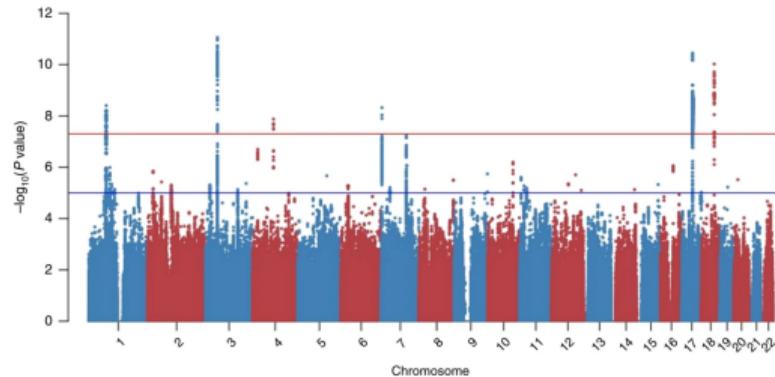
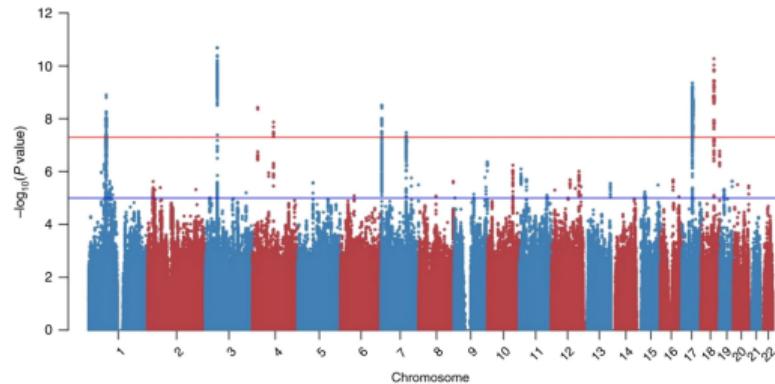
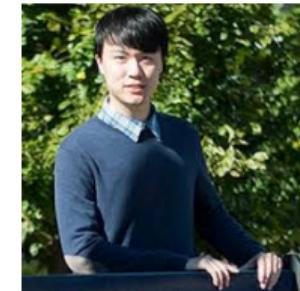
- ▶ Collaboration
- ▶ Data exploration
- ▶ Methods development
- ▶ Software development

The work

- ▶ Collaboration
- ▶ Data exploration
- ▶ Methods development
- ▶ Software development
 - R
 - C++
 - Coffeescript
 - Ruby

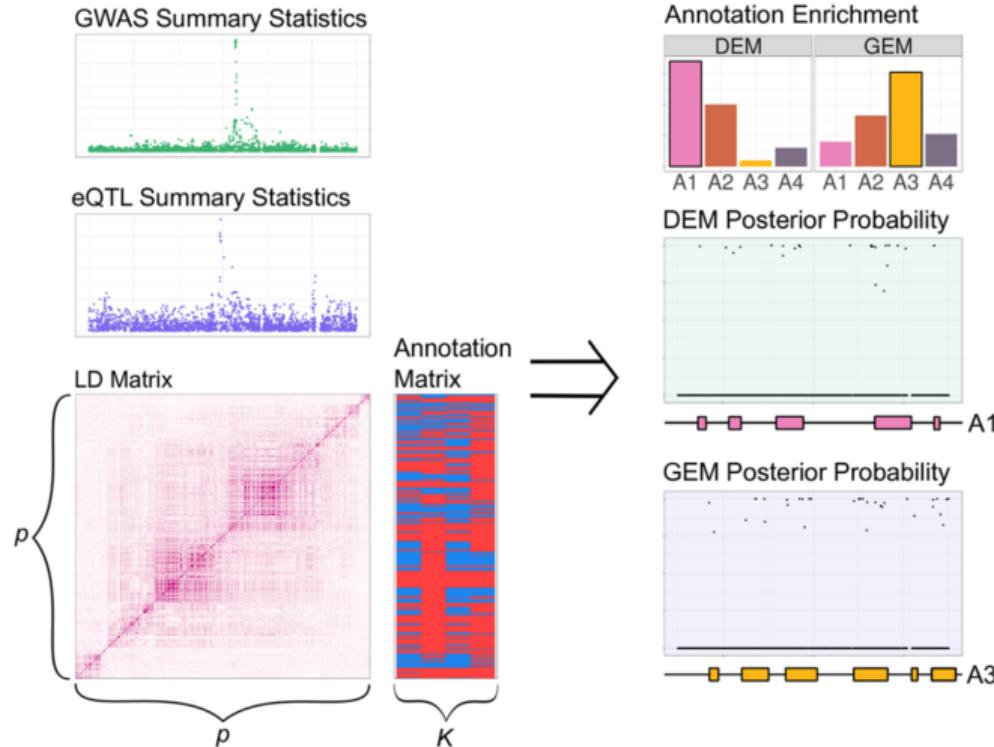
Qiongshi Lu

Human genome-wide association studies



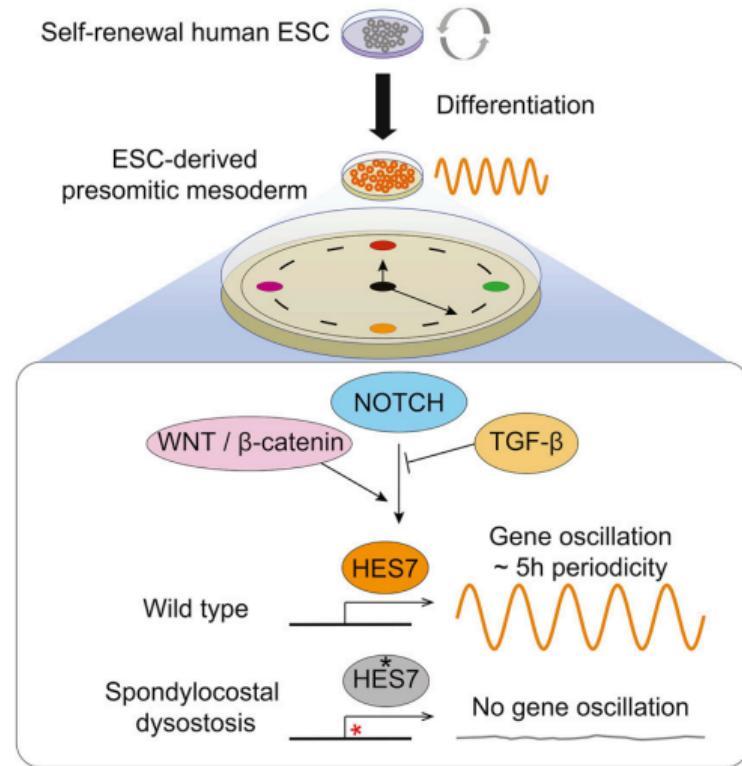
Sündüz Keleş

Functional mediation analysis



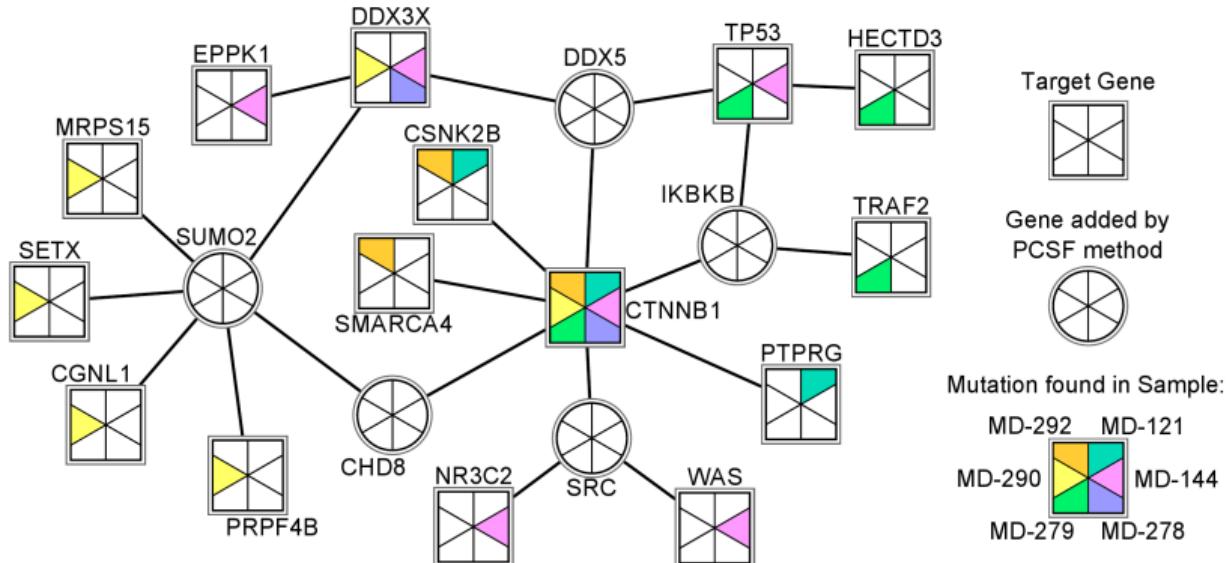
Christina Kendziorski

Clock genes in stem cells



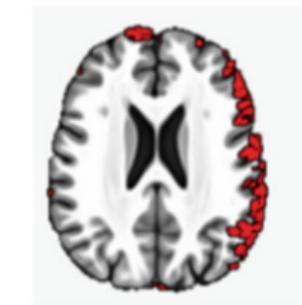
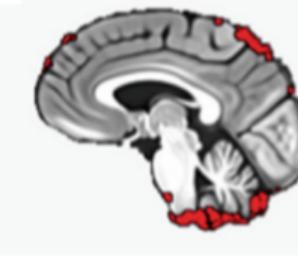
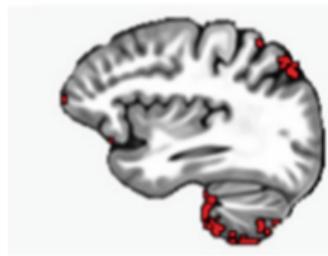
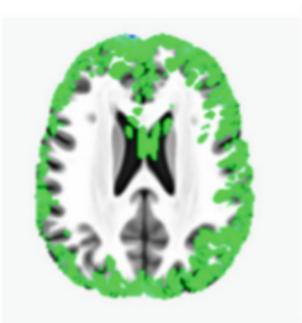
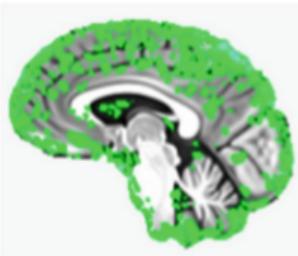
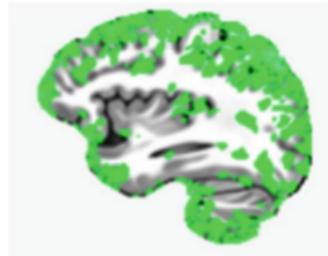
Tony Gitter

Pathways disrupted by cancer



Vikas Singh

Analysis of brain images



Biomedical data science PhD at UW-Madison

- ▶ Faculty spanning biostatistics, bioinformatics, and computer science
- ▶ Broad opportunities for scientific collaborations
- ▶ Flexible course requirements
- ▶ Research rotations
- ▶ Literature and professional skills seminars

bit.ly/madbds



Slides: bit.ly/srop2023

kbroman.org

github.com/kbroman

@kbroman@fosstodon.org