Statistical Genetics, from classical to a Bayesian perspective
April 2024 in Lincoln (Plant and Food Research)

Instructors

Bruce Weir (https://www.biostat.washington.edu/people/bruce-weir, University of Washington and Massey University) and Matthieu Vignes (https://www.massey.ac.nz/massey/expertise/profile.cfm?stref=651350, Massey University)

Final programme

	Tuesday 9 April	Wednesday 10 April	Thursday 11 April	Friday 12 April
8.45-10.15	Allele frequency estimation	Hardy Weinberg testing	Inbreeding and relatedness estimation	Practical session (Pop. structure)
10.15-10.30	Coffee/tea break			
10.30-noon	Practical session (AFE)	Practical session (HWT)	Practical session (Inbreed. & Relatedness)	Bayesian session IV
Noon-13.15	Lunch			
13.15-14.45	Introduction to Bayesian statistics for geneticists	Bayesian session III	Population structure	End of the workshop
14.45-15.00	Coffee/tea break			
15.00-16.30	Bayesian session II	Guest Session I	Guest session II	

More details

- Tuesday 9 April
 am: "Allele frequency estimation" & Practical session
 pm: "Introduction to Bayesian statistics for geneticists" (Introduction to Bayesian statistics and binomial sampling) & Bayesian session II (More binomial sampling and Monte Carlo)
 - Wednesday 10 April
 am: "Hardy Weinberg testing" & Practical session
 pm: Bayesian session III (Markov Chains, MCMC: MH algorithm, Gibbs sampling, IS) & Guest session I (see below)
 - Thursday 11 April
 am: "Inbreeding and relatedness estimation" & Practical Session
pm: "Population structure" & Guest session III (see below)
 - Friday 12 April
  am: Practical session (pop structure) & "Bayesian session IV (Linear models, HWE, data imputation)

Guest session I (Wed 10 April, 3pm)

- Olivia Angelin-Bonnet (PFR) - Investigating the genetic components of tuber bruising in a breeding population of tetraploid potatoes
- Martin Kennedy (University of Otago) - Psychiatric genetics: why do it and where are we now?
- Darrell Lizamore (BRI) - New genomics tools for managing climate resilience in grapevine & other clonally-propagated crops
- Chris(topher) Winefiled (Lincoln University) - Searching the repeat element space of plant genomes for the hidden gems that are the active transposable elements contributing to genome evolution

Guest session II (Thu 11 April 2024, 3pm)

- Timothy Bilton (AgResearch) - Advantages of Bayesian hierarchical modelling for constructing genetic linkage maps
- Jessie Preble and Rob Smissen (Landcare Research) - Assembling the genome of rātā Moehau and applications for other NZ Metrosideros
- Jeanne Jacobs (AgResearch) - Genomics for the Pacific: Coconut Rhinoceros Beetle and its biocontrol agent Oryctes Nudivirus

Computer practicals

All practical sessions in R. We ask you to have R installed on your laptop before attending the workshop. Also see additional packages in companion email.

Reading for Bayesian stuff (not compulsory)

- Fu, Dey and Holsinger, Bioinformatics, 2004
- Puig, Ginebra and Graffelman, Heredity, 2017
- Puig, Ginebra and Graffelman, Heredity, 2019
- McElreath, Statistical Rethinking, 2021
- Johnson, Ott and Dogucu, Bayes Rules!, 2021