Supervised detection of the same peaks jointly across several ChIP-seq samples
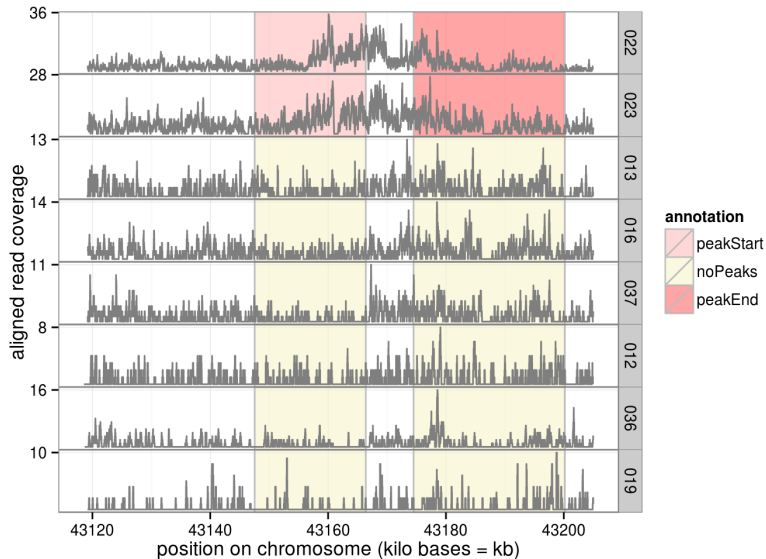
Toby Dylan Hocking
toby.hocking@mail.mcgill.ca
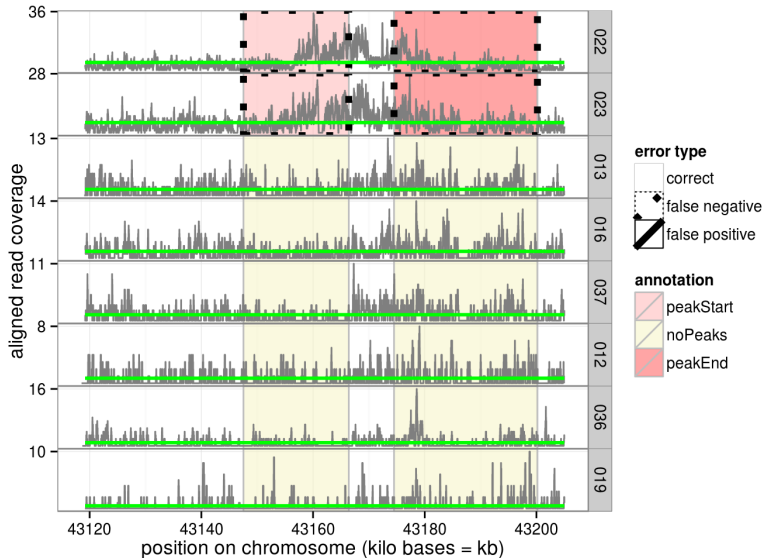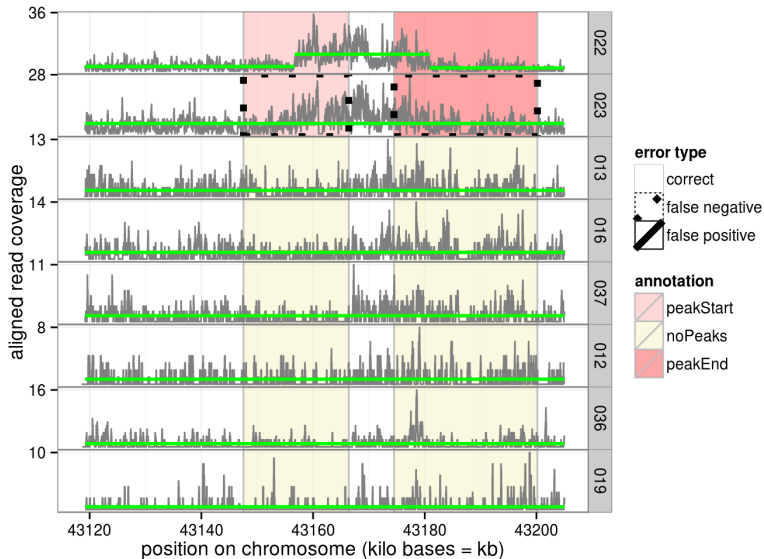joint work with Guillem Rigaill and Guillaume Bourque
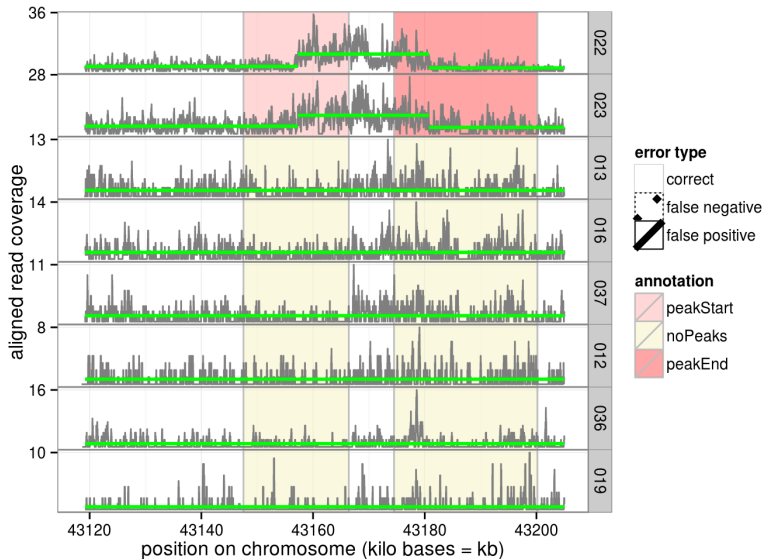
2 April 2015

H3K36me3 data and labels

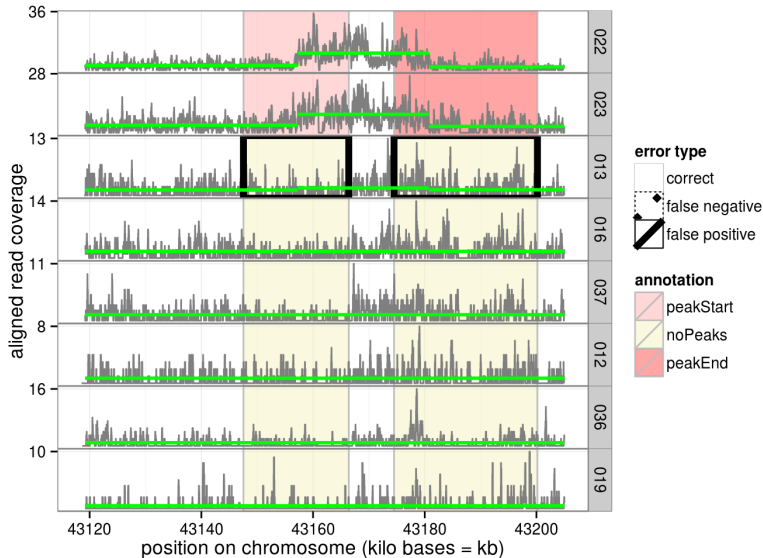# PeakSegJoint model with 0 peaks
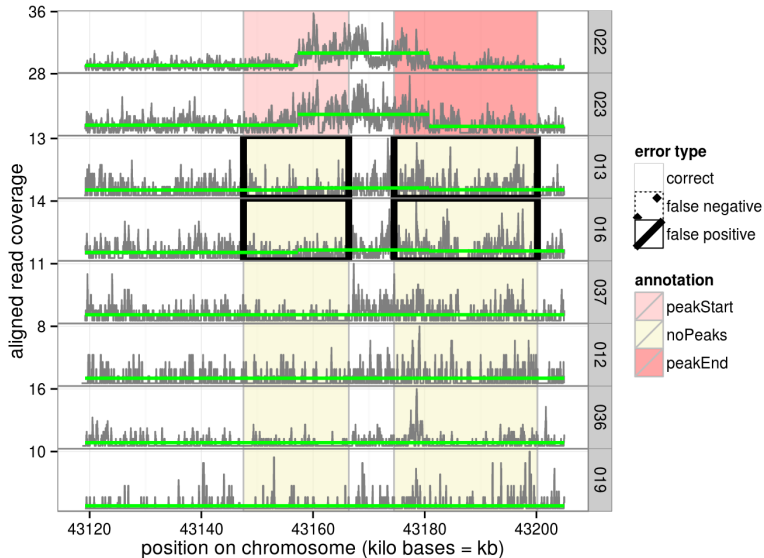
PeakSegJoint model with 1 peak

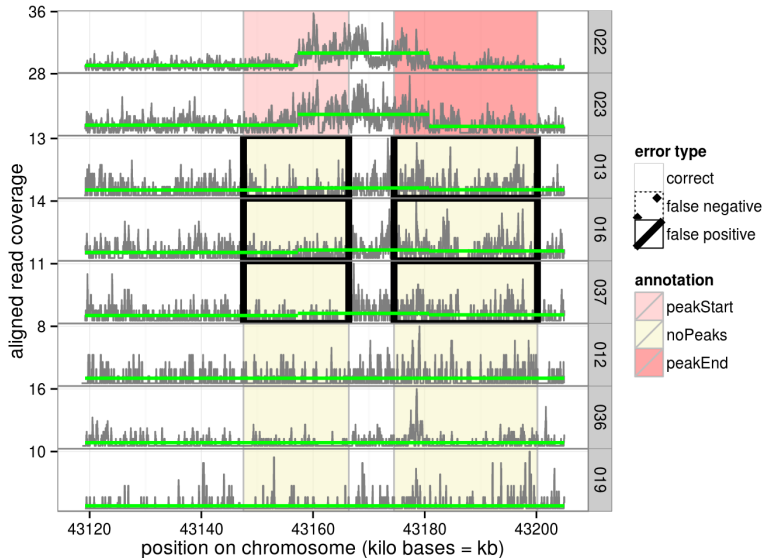# PeakSegJoint model with 2 peaks

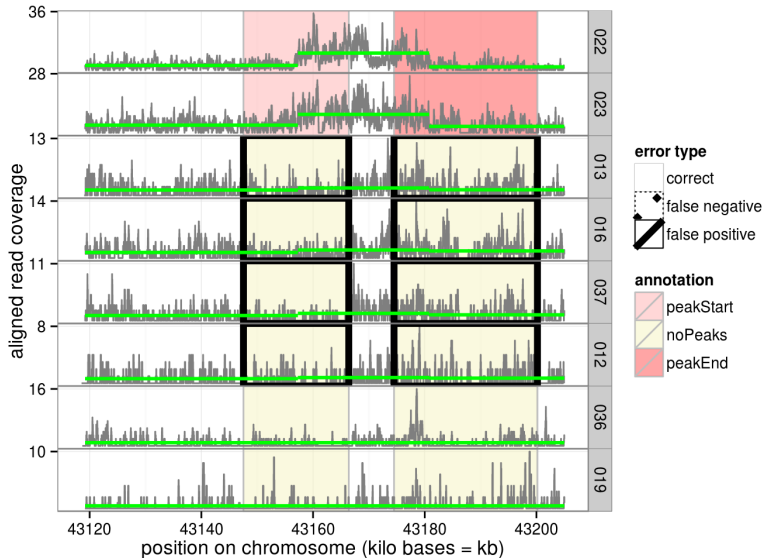# PeakSegJoint model with 3 peaks
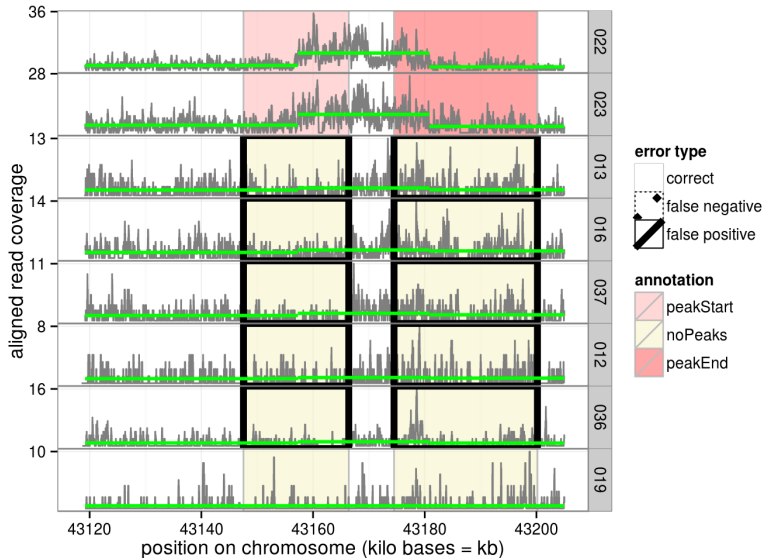
PeakSegJoint model with 4 peaks
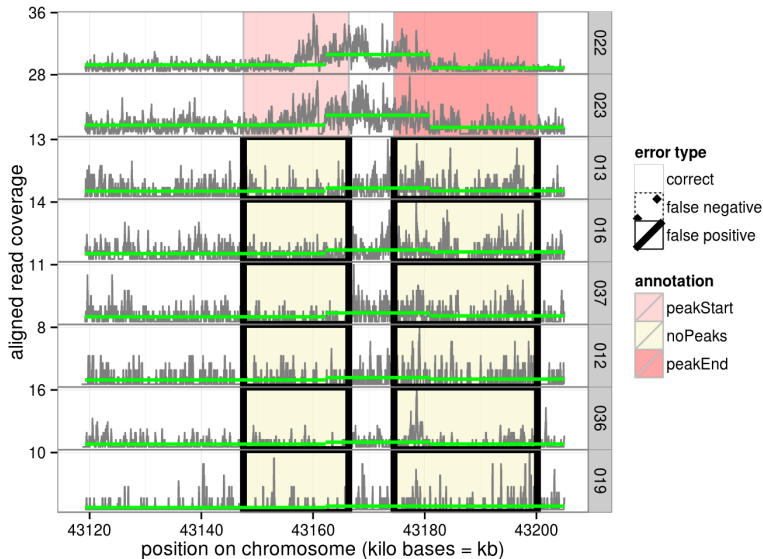
PeakSegJoint model with 5 peaks
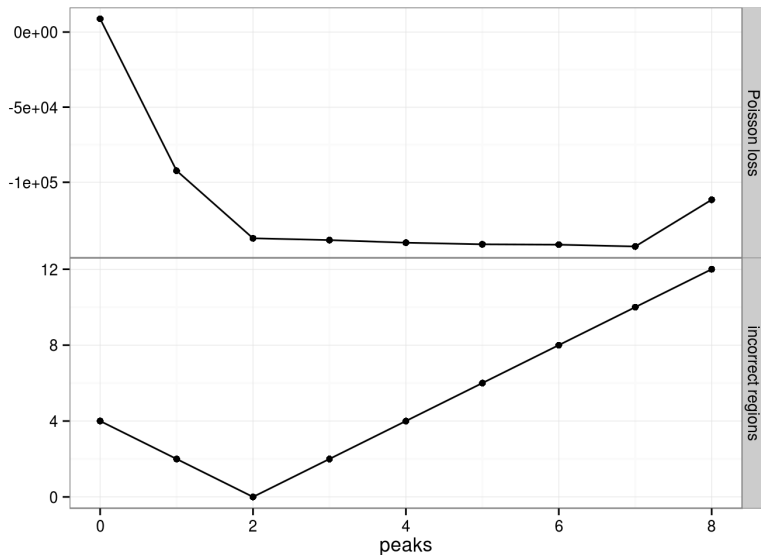
PeakSegJoint model with 6 peaks

PeakSegJoint model with 7 peaks

PeakSegJoint model with 8 peaks

Select model with minimal number of incorrect regions

H3K36me3 data, PeakSeg and Joint model
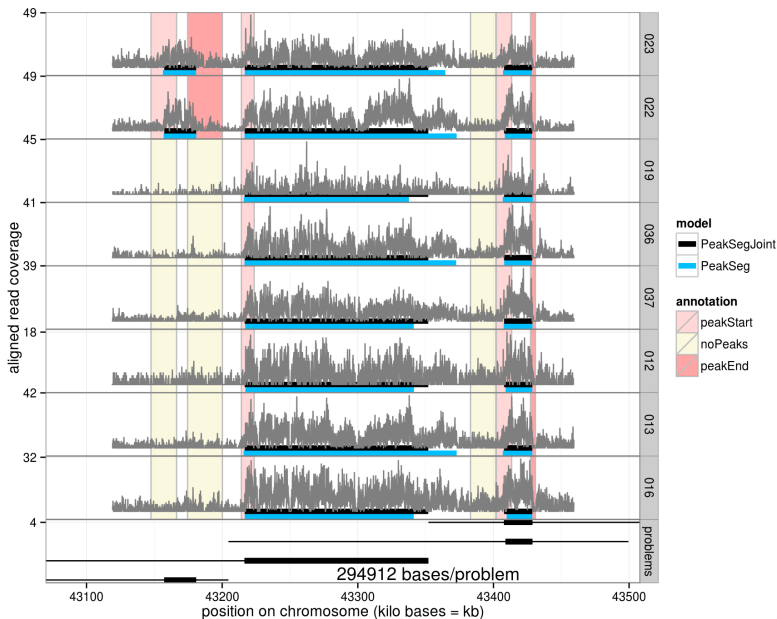
Timings on example H3K36me3 data

Segment each of 8 samples (PeakSeg):

seconds	sample.id
0.72	McGill0023
0.75	McGill0022
0.73	McGill0019
0.74	McGill0036
0.74	McGill0037
0.74	McGill0012
0.74	McGill0013
0.75	McGill0016
5.90	total

Segment each of 4 genomic regions (PeakSegJoint):

	data	seconds
chr21:42909696-43204608	23595	0.04
chr21:43057152-43352064	162129	0.09
chr21:43204608-43499520	206437	0.11
chr21:43352064-43646976	67903	0.06
total		0.30

H3K4me3 data, PeakSeg and Joint model
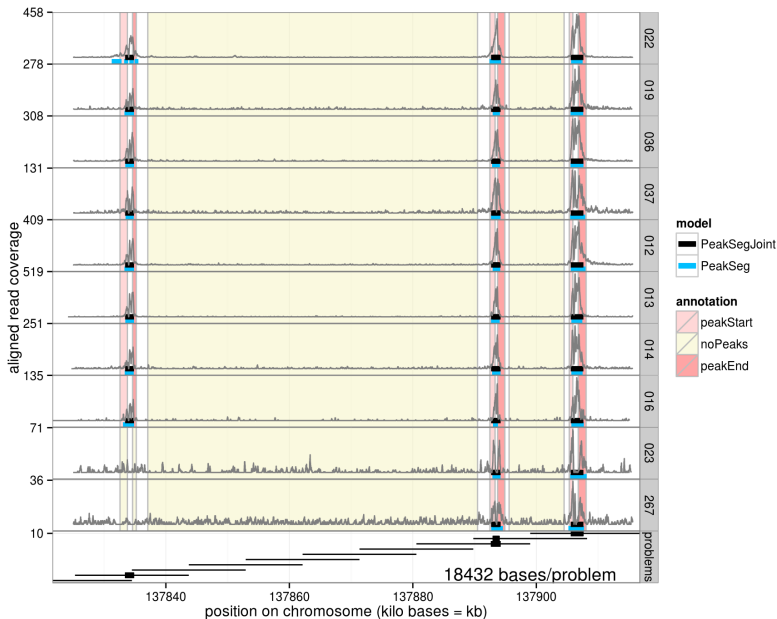
Timings on example H3K4me3 data

seconds	sample.id
0.76	McGill0022
0.74	McGill0019
0.74	McGill0036
0.75	McGill0037
0.75	McGill0012
0.73	McGill0013
0.74	McGill0014
0.74	McGill0016
0.74	McGill0023
0.75	McGill0267
7.44	total

Segment each of 10 samples (PeakSeg)

	data	seconds
chr21:137816064-137834496	7603	0.01
chr21:137825280-137843712	12420	0.05
chr21:137834496-137852928	7023	0.01
chr21:137843712-137862144	3915	0.04
chr21:137852928-137871360	3597	0.03
chr21:137862144-137880576	3588	0.03
chr21:137871360-137889792	4255	0.05
chr21:137880576-137899008	13317	0.05
chr21:137889792-137908224	26436	0.06
chr21:137899008-137917440	19644	0.06
total		0.39

Segment each of 10 genomic regions (PeakSegJoint)