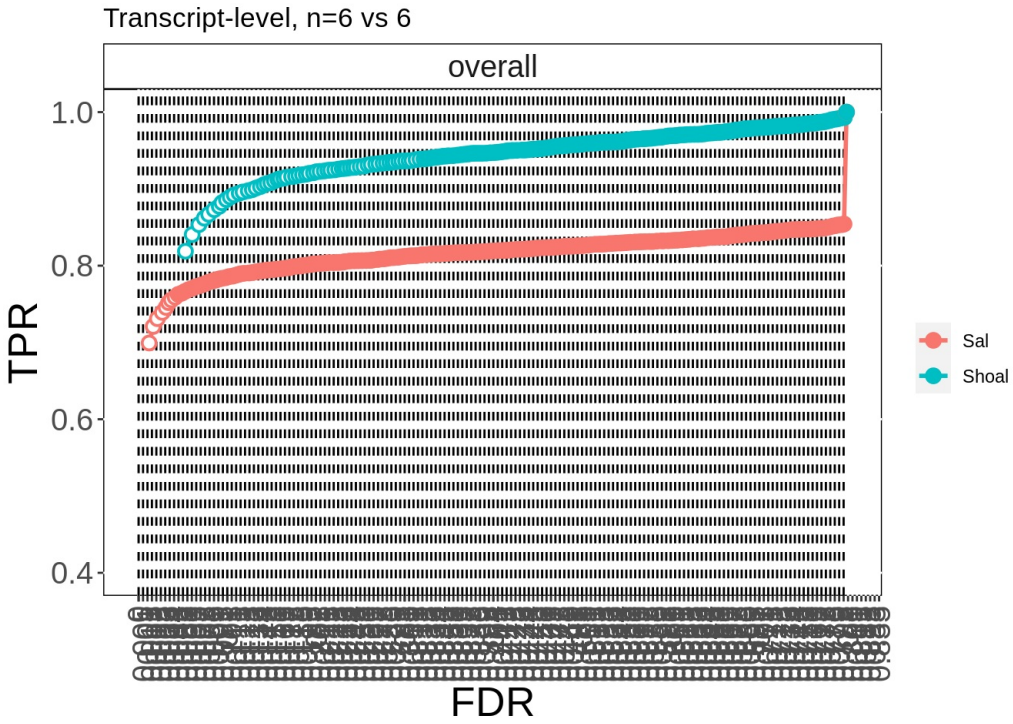
Analyzing Shoal

Noor Pratap Singh

1/4/2022

```
suppressPackageStartupMessages(source("run_limma.R"))
dirSal <- "/fs/cbcb-lab/rob/students/noor/shoal_proj/swim/sal_best/vbprior=1e0"
load("/fs/cbcb-lab/rob/students/noor/Uncertainity/mikelove-swimdown-216a1dd/simulate/data/simulate.rda")
library(pracma)
```

```
dirShoal <- "/fs/cbcb-lab/rob/students/noor/shoal_proj/swim/shoal_best_true_de_fac/vbprior=1e0/c=0.1"
suppressWarnings(dd <- runDE(dirSal, dirShoal, seq(0,1,0.005)))
df <- dd[["cob"]][["cob"]][[1]]@fdrtpr
inds <- seq(1,nrow(df),2)

dd[["cob"]][["cob"]][[2]]
```



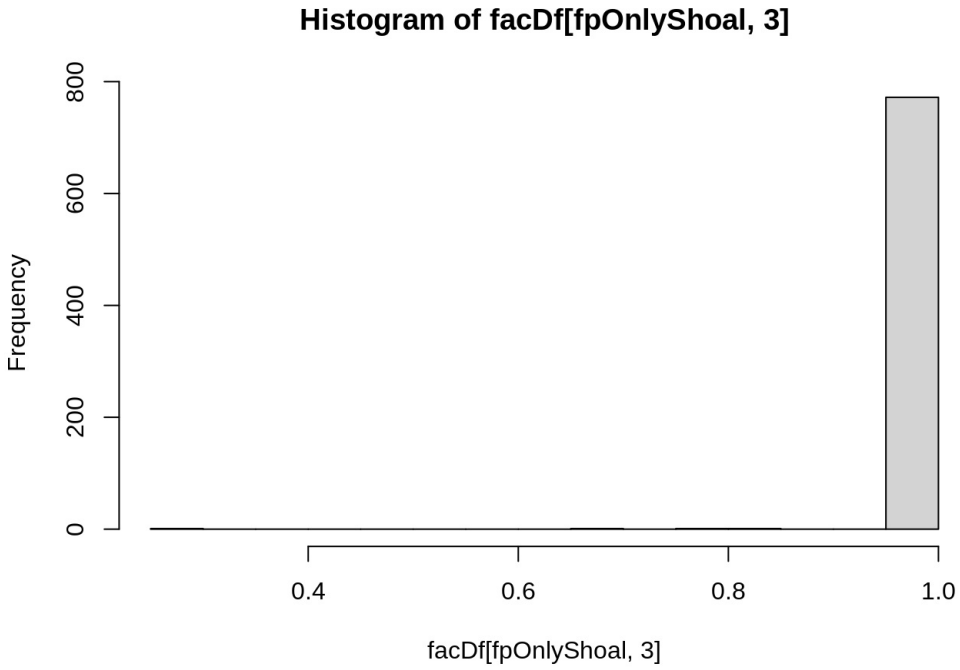

```
print(trapz(df[inds, "FDR"], df[inds, "TPR"])) ##Area under roc curve for Salmon
```

```
## [1] 0.6455251
```

```
print(trapz(df[inds+1, "FDR"], df[inds+1, "TPR"])) ##Area under roc curve for Shoal
```

```
## [1] 0.7259636
```

```
pShoal <- which(dd[["cob"]][["cd"]]@padj$Shoal <= 0.1)
pSal <- which(dd[["cob"]][["cd"]]@padj$Sal <= 0.1)
fpSal <- setdiff(pSal, which(dd[["cob"]][["cd"]]@truth$status==1))
fpShoal <- setdiff(pShoal, which(dd[["cob"]][["cd"]]@truth$status==1))
fpOnlyShoal <- rownames(dd[["cob"]][["cd"]]@truth)[setdiff(fpShoal, fpSal)]
facDf <- read.delim("swim/shoal_best_true_de_fac/vbprior=1e0/c=0.1/prior.tsv", row.names = 1)
hist(facDf[fpOnlyShoal,3])
```



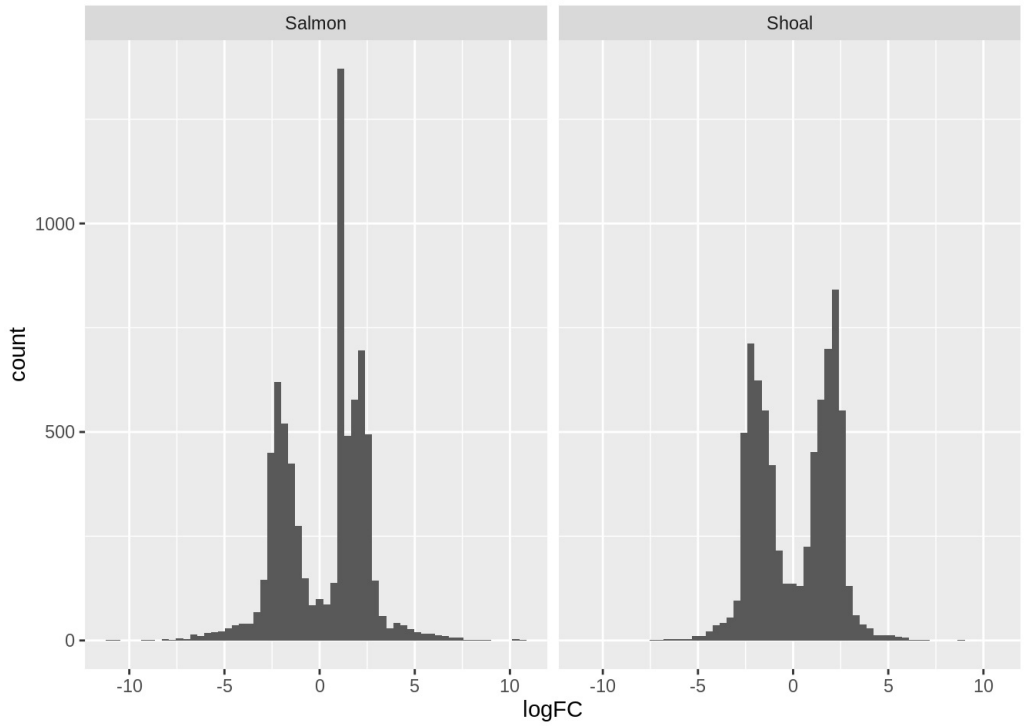

```
DeTxps <- rownames(dd[["cob"]][["cd"]]@truth)[dd[["cob"]][["cd"]]@truth==1]
nonDeTxps <- rownames(dd[["cob"]][["cd"]]@truth)[dd[["cob"]][["cd"]]@truth==0]
```

Creating data frame

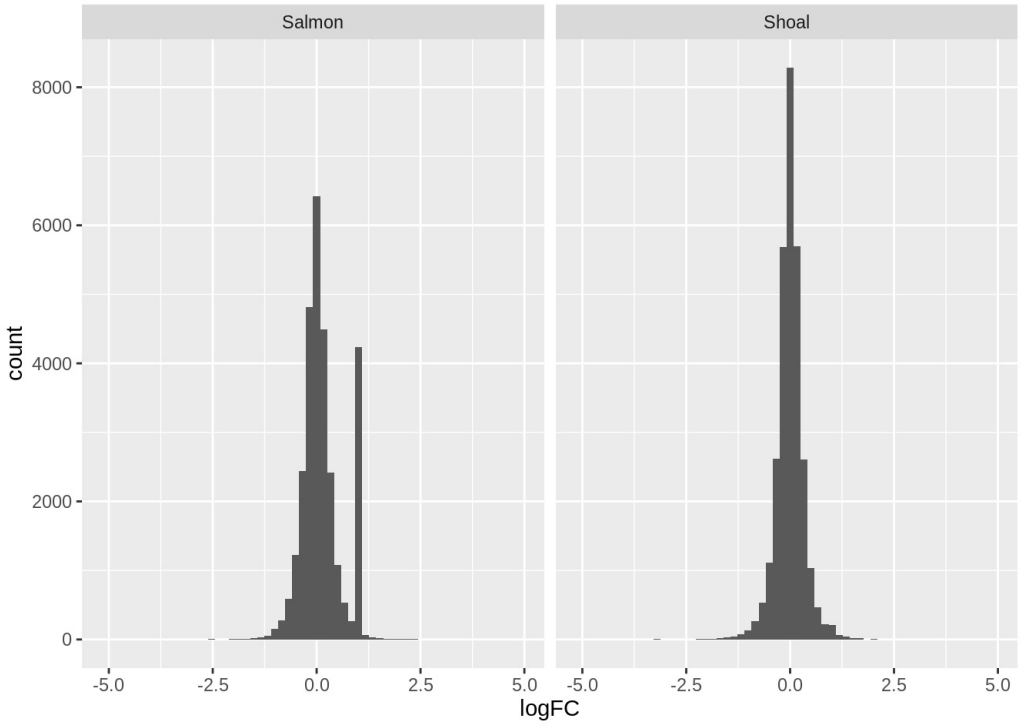
```
dfQ <- data.frame(logFC = c(dd[["cob"]][["salLimma"]][DeTxps,"logFC"],
                            dd[["cob"]][["salLimma"]][nonDeTxps,"logFC"],
                          dd[["cob"]][["shoalLimma"]][DeTxps,"logFC"],
                          dd[["cob"]][["shoalLimma"]][nonDeTxps,"logFC"]),
                  DEStatus = rep(rep(c("DE", "NonDE"), c(length(DeTxps), length(nonDeTxps))),2),
                  quantMethod = rep(c("Salmon", "Shoal"), c(nrow(dd[["cob"]][["salLimma"]]), nrow(dd[["cob"]][["sa
lLimma"]]))),
                  txps = rep(c(DeTxps, nonDeTxps),2))
```

Histogram of logFCs

```
library(ggplot2)
library(dplyr)
dfQ %>% filter(DEStatus=="DE") %>%
    ggplot(aes(x=logFC)) + geom_histogram(bins=60) +
    facet_grid(~quantMethod)
```

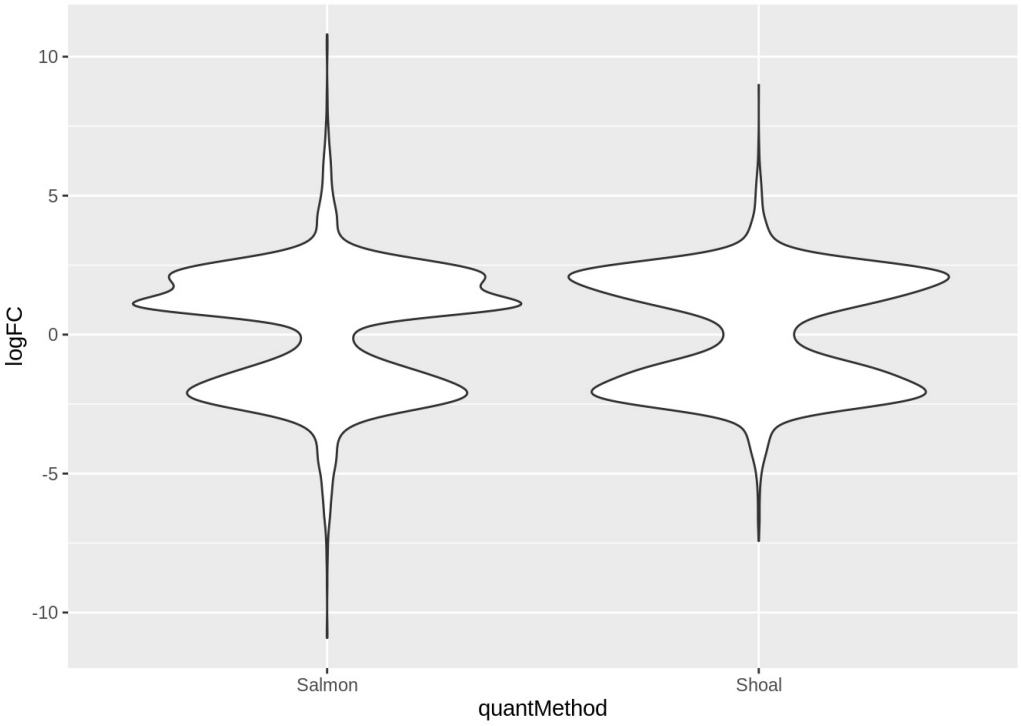


```
dfQ %>% filter(DEStatus=="NonDE") %>%
    ggplot(aes(x=logFC)) + geom_histogram(bins=60) +
    facet_grid(~quantMethod)
```

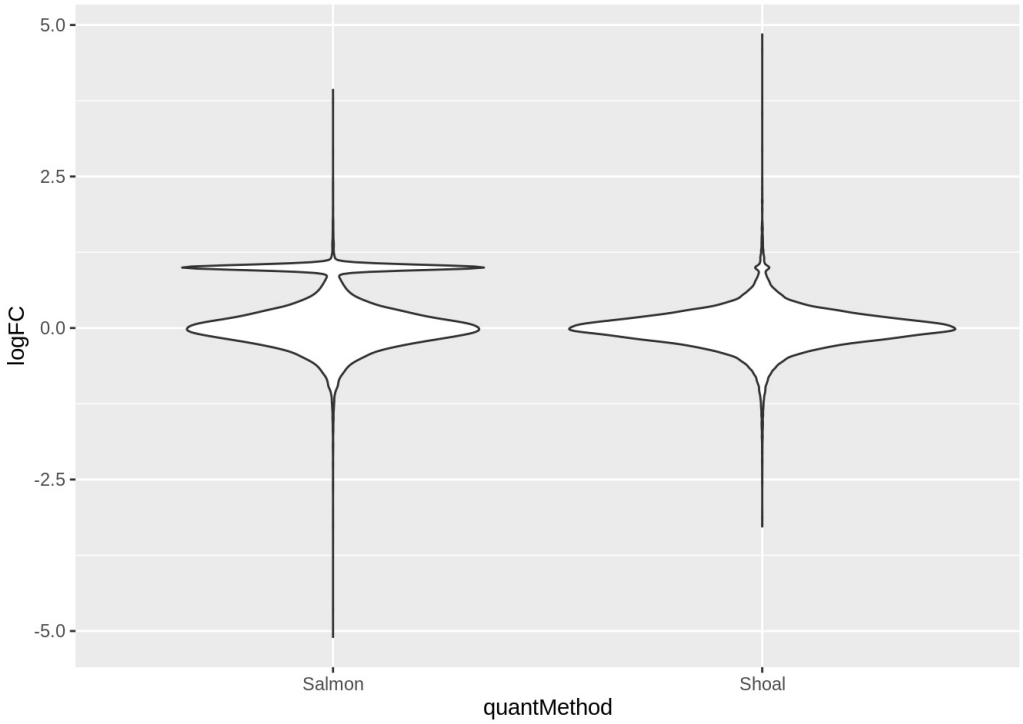


Violin plot of logFCs

```
dfQ %>% filter(DEStatus=="DE") %>%
    ggplot(aes(y=logFC, x=quantMethod)) + geom_violin()
```

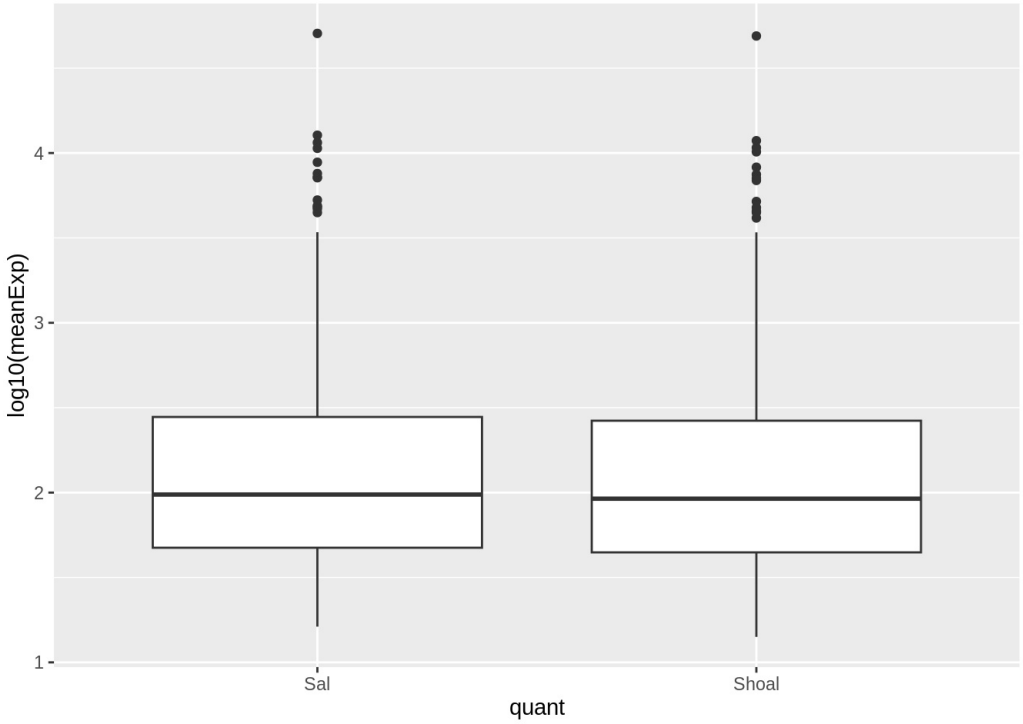



```
dfQ %>% filter(DEStatus=="NonDE") %>%
    ggplot(aes(y=logFC, x=quantMethod)) + geom_violin()
```



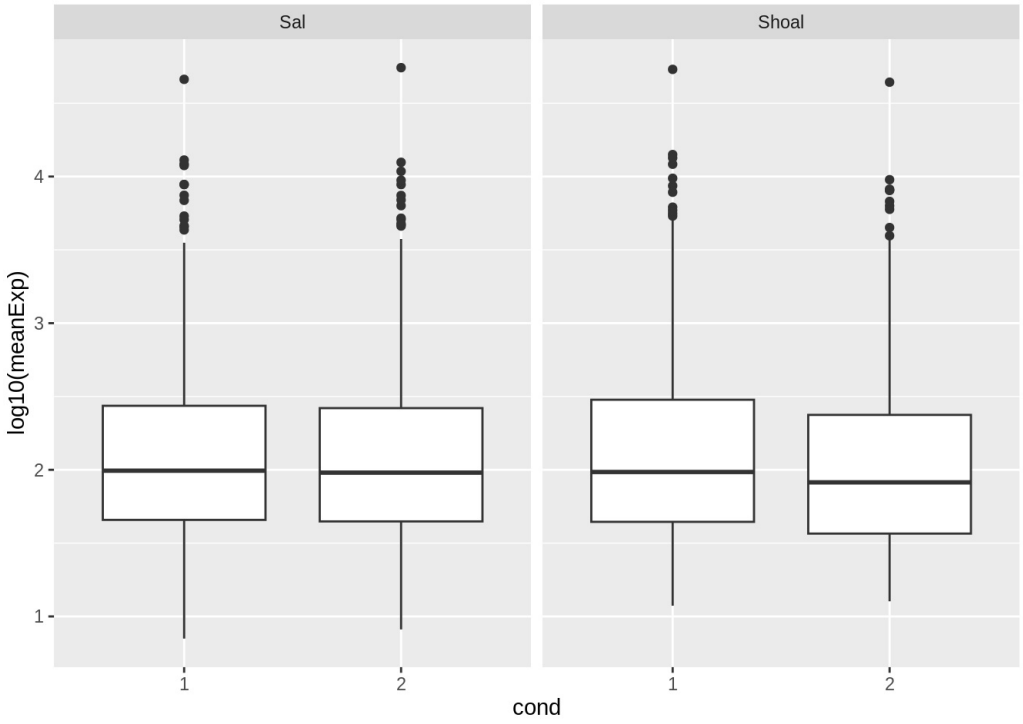
Plotting boxplot shoal false positives

```
rMSal <- rowMeans(dd$counts$txiSal$counts[fpOnlyShoal,])
rMShoal <- rowMeans(dd$counts$txiShoal$counts[fpOnlyShoal,])

dfMean <- data.frame(meanExp=c(rMSal, rMShoal), quant = rep(c("Sal", "Shoal"), c(length(rMSal), length(rMSal))))
ggplot(dfMean, aes(x=quant, y=log10(meanExp))) + geom_boxplot()
```



Plotting boxplot per condition shoal false positives

```
rMSalC1 <- rowMeans(dd$counts$txiSal$counts[fpOnlyShoal,1:6])
rMSalC2 <- rowMeans(dd$counts$txiSal$counts[fpOnlyShoal,6+1:6])
rMShoalC1 <- rowMeans(dd$counts$txiShoal$counts[fpOnlyShoal,1:6])
rMShoalC2 <- rowMeans(dd$counts$txiShoal$counts[fpOnlyShoal,6+1:6])

dfMean <- data.frame(meanExp=c(rMSalC1, rMSalC2, rMShoalC1, rMShoalC2),
                     quant = rep(c("Sal", "Shoal"), c(length(rMSal)*2, length(rMSal)*2)),
                     cond = rep(rep(c("1", "2"), c(length(rMSal), length(rMSal))), times=2))
ggplot(dfMean, aes(x=cond, y=log10(meanExp))) + geom_boxplot() + facet_grid(~quant)
```


Sal
Shoal
log10(meanExp)
4
3
2
1
1
2
1
2
cond