Spacek et al., 2021, Figure 4

Figure 4a

Modulation of firing rate by feedback during movie or grating presentations

```
# Random intercept for neurons
lmer.4a = lmer(meanrate ~ stimtype + (1 | uid),
               data = t4a %>% drop_na(meanrate))

display(lmer.4a)
```

```
## lmer(formula = meanrate ~ stimtype + (1 | uid), data = t4a %>%
##     drop_na(meanrate))
##             coef.est coef.se
## (Intercept) 0.05     0.04
## stimtypemvi 0.09     0.04
##
## Error terms:
##  Groups   Name        Std.Dev.
##  uid      (Intercept) 0.16
##  Residual             0.18
## ---
## number of obs: 78, groups: uid, 39
## AIC = 8.4, DIC = -18.7
## deviance = -9.2
```

```
anova(lmer.4a)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##           Sum Sq Mean Sq NumDF DenDF F value  Pr(>F)
## stimtype 0.17054 0.17054     1    38  5.2084 0.02816 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Grating: FMI = 0.053
Movie: FMI = 0.15
n = 39 neurons from 4 mice

Figure 4b

Modulation of firing rate by feedback during gray screen conditions

```
# Random intercept for neurons
lmer.4b = lmer(meanrate ~ blank_condition + (1 | uid),
               data = t4b %>% drop_na(meanrate))

display(lmer.4b)
```

```
## lmer(formula = meanrate ~ blank_condition + (1 | uid), data = t4b %>%
##     drop_na(meanrate))
##                       coef.est coef.se
## (Intercept)            0.30     0.05
## blank_conditiongrt0c   0.06     0.05
## blank_conditionmvi    -0.03     0.05
##
## Error terms:
##  Groups   Name        Std.Dev.
##  uid      (Intercept) 0.23
##  Residual             0.21
## ---
## number of obs: 117, groups: uid, 39
## AIC = 45.7, DIC = 8.9
## deviance = 22.3
```

```
anova(lmer.4b)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##                   Sum Sq  Mean Sq NumDF DenDF F value Pr(>F)
## blank_condition 0.14645 0.073226     2    76  1.6846 0.1924
```

Blank before movie: FMI = 0.27
Blank before grating: FMI = 0.30
Zero contrast grating: FMI = 0.36
n = 39 neurons from 4 mice

(I) Pooling across blank conditions, and comparing against the FMI for movies

```
# Random intercept for neurons
lmer.I = lmer(meanrate ~ stim_condition  + (1 | uid),
              data = t4_p1 %>% drop_na(meanrate))

display(lmer.I)
```

```
## lmer(formula = meanrate ~ stim_condition + (1 | uid), data = t4_p1 %>%
##     drop_na(meanrate))
##                   coef.est coef.se
## (Intercept)        0.31     0.04
## stim_conditionmvi -0.16     0.04
##
## Error terms:
##  Groups   Name        Std.Dev.
##  uid      (Intercept) 0.18
##  Residual             0.23
## ---
## number of obs: 156, groups: uid, 39
## AIC = 47.9, DIC = 21.1
## deviance = 30.5
```

```
anova(lmer.I)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##                 Sum Sq Mean Sq NumDF DenDF F value    Pr(>F)
## stim_condition 0.79145 0.79145     1   116  15.108 0.0001695 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

n = 39 neurons from 4 mice

(II) Pooling across blank conditions, and comparing against the FMI for gratings

```
# Random intercept for neurons
lmer.II = lmer(meanrate ~ stim_condition  + (1 | uid), t4_p2)
display(lmer.II)
```

```
## lmer(formula = meanrate ~ stim_condition + (1 | uid), data = t4_p2)
##                   coef.est coef.se
## (Intercept)        0.31     0.04
## stim_conditiongrt -0.26     0.04
##
## Error terms:
##  Groups   Name        Std.Dev.
##  uid      (Intercept) 0.18
##  Residual             0.24
## ---
## number of obs: 156, groups: uid, 39
## AIC = 55.6, DIC = 29
## deviance = 38.3
```

```
anova(lmer.II)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##                Sum Sq Mean Sq NumDF DenDF F value    Pr(>F)
## stim_condition 1.9472  1.9472     1   116  34.876 3.581e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

n = 39 neurons from 4 mice