Spacek et al., 2021, Figure 1-Supplement 3

Figure 1-Supplement 3a

Firing rate FMIs separated by cell types

```
# Random intercept for series
lmer.1_S3a = lmer(mvi_meanrate ~ sbc  + (1 | sid),
                  data = tb %>% drop_na(mvi_meanrate))

display(lmer.1_S3a)
```

```
## lmer(formula = mvi_meanrate ~ sbc + (1 | sid), data = tb %>%
##     drop_na(mvi_meanrate))
##             coef.est coef.se
## (Intercept)  0.20     0.05
## sbc         -0.14     0.07
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid      (Intercept) 0.05
##  Residual             0.22
## ---
## number of obs: 39, groups: sid, 8
## AIC = 7.6, DIC = -16.5
## deviance = -8.4
```

```
anova(lmer.1_S3a)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##     Sum Sq Mean Sq NumDF  DenDF F value  Pr(>F)
## sbc 0.1676  0.1676     1 36.964  3.5135 0.06879 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

FMI sbc: 0.0624
FMI non-sbc: 0.202
n = 39 neurons from 4 mice

Figure 1-Supplement 3b

Relation between firing rate FMI and recording depth

```
# Random intercept for series
lmer.1_S3b = lmer(mvi_meanrate ~ depth  + (1 | sid),
                  data = tib %>% drop_na(mvi_meanrate, depth))

display(lmer.1_S3b)
```

```
## lmer(formula = mvi_meanrate ~ depth + (1 | sid), data = tib %>%
##     drop_na(mvi_meanrate, depth))
##             coef.est coef.se
## (Intercept) 0.23     0.06
## depth       0.00     0.00
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid      (Intercept) 0.04
##  Residual             0.23
## ---
## number of obs: 63, groups: sid, 11
## AIC = 19.4, DIC = -28.8
## deviance = -8.7
```

```
anova(lmer.1_S3b)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##         Sum Sq  Mean Sq NumDF  DenDF F value Pr(>F)
## depth 0.096821 0.096821     1 54.739  1.8853 0.1753
```

Slope of -0.00031 ± 0.00046 (95%-confidence interval)
n = 63 neurons from 6 mice

Figure 1-Supplement 3c

Relation between firing rate FMI and direction selectivity

```
# Random intercept for series
lmer.1_S3c = lmer(mvi_meanrate ~ dsi + (1 | sid),
                  data = tib %>% drop_na(mvi_meanrate, dsi))

display(lmer.1_S3c)
```

```
## lmer(formula = mvi_meanrate ~ dsi + (1 | sid), data = tib %>%
##     drop_na(mvi_meanrate, dsi))
##             coef.est coef.se
## (Intercept)  0.16     0.06
## dsi         -0.03     0.19
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid      (Intercept) 0.09
##  Residual             0.22
## ---
## number of obs: 39, groups: sid, 8
## AIC = 8.8, DIC = -10.8
## deviance = -5.0
```

```
anova(lmer.1_S3c)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##        Sum Sq   Mean Sq NumDF  DenDF F value Pr(>F)
## dsi 0.0016298 0.0016298     1 36.714  0.0333 0.8562
```

Slope of -0.034 ± 0.37 (95%-confidence interval)
n = 39 neurons from 4 mice

Figure 1-Supplement 3d

Relation between firing rate FMI and receptive field location

```
# Random intercept for series nested within mice
lmer.1_S3d = lmer(mvi_meanrate ~ rfdist + (1 | mid/sid),
                  data = tib %>% drop_na(mvi_meanrate, rfdist))
display(lmer.1_S3d)
```

```
## lmer(formula = mvi_meanrate ~ rfdist + (1 | mid/sid), data = tib %>%
##     drop_na(mvi_meanrate, rfdist))
##             coef.est coef.se
## (Intercept) 0.21     0.09
## rfdist      0.00     0.00
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid:mid  (Intercept) 0.10
##  mid      (Intercept) 0.07
##  Residual             0.19
## ---
## number of obs: 54, groups: sid:mid, 11; mid, 6
## AIC = 8.8, DIC = -27.9
## deviance = -14.6
```

```
anova(lmer.1_S3d)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##          Sum Sq  Mean Sq NumDF  DenDF F value Pr(>F)
## rfdist 0.026228 0.026228     1 47.896  0.6914 0.4098
```

Slope of -0.0035 $\pm$ 0.0083 (95%-confidence interval)
n = 54 neurons from 6 mice

Figure 1-Supplement 3e

Relation between firing rate FMI and firing rate

```
# Random intercept for series nested within mice
lmer.1_S3e = lmer(mvi_meanrate ~ mvi_meanrate_raw + (1 | mid/sid),
                  data = tib %>% drop_na(mvi_meanrate, mvi_meanrate_raw))

display(lmer.1_S3e)
```

```
## lmer(formula = mvi_meanrate ~ mvi_meanrate_raw + (1 | mid/sid),
##     data = tib %>% drop_na(mvi_meanrate, mvi_meanrate_raw))
##                   coef.est coef.se
## (Intercept)       0.16     0.06
## mvi_meanrate_raw 0.00     0.00
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid:mid  (Intercept) 0.04
##  mid      (Intercept) 0.05
##  Residual             0.23
## ---
## number of obs: 64, groups: sid:mid, 11; mid, 6
## AIC = 19.8, DIC = -19.3
## deviance = -4.7
```

```
anova(lmer.1_S3e)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##                      Sum Sq   Mean Sq NumDF  DenDF F value Pr(>F)
## mvi_meanrate_raw 0.0015766 0.0015766     1 59.896  0.0299 0.8634
```

Slope of 0.00052 ± 0.006 (95%-confidence interval)
n = 64 neurons from 6 mice

Figure 1-Supplement 3f

Burst ratio FMIs separated by cell types

```
# Random intercept for series
lmer.1_S3f = lmer(mvi_meanburstratio ~ sbc  + (1 | sid),
                  data = tb %>% drop_na(mvi_meanburstratio))

display(lmer.1_S3f)
```

```
## lmer(formula = mvi_meanburstratio ~ sbc + (1 | sid), data = tb %>%
##     drop_na(mvi_meanburstratio))
##             coef.est coef.se
## (Intercept) -0.36     0.12
## sbc         -0.04     0.06
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid      (Intercept) 0.31
##  Residual             0.16
## ---
## number of obs: 38, groups: sid, 8
## AIC = 2.3, DIC = -18.3
## deviance = -12.0
```

```
anova(lmer.1_S3f)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##       Sum Sq  Mean Sq NumDF  DenDF F value Pr(>F)
## sbc 0.011033 0.011033     1 30.767  0.4158 0.5238
```

FMI sbc: -0.403
FMI non-sbc -0.363
n = 38 neurons from 4 mice

Figure 1-Supplement 3g

Relation between burst ratio FMI and recording depth

```
# Random intercept for series nested within mice
lmer.1_S3g = lmer(mvi_meanburstratio ~ depth  + (1 | mid/sid),
                  data = tib %>% drop_na(mvi_meanburstratio, depth))
```

```
## boundary (singular) fit: see ?isSingular
```

```
display(lmer.1_S3g)
```

```
## lmer(formula = mvi_meanburstratio ~ depth + (1 | mid/sid), data = tib %>%
##     drop_na(mvi_meanburstratio, depth))
##             coef.est coef.se
## (Intercept) -0.17     0.10
## depth        0.00     0.00
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid:mid  (Intercept) 0.20
##  mid      (Intercept) 0.00
##  Residual             0.25
## ---
## number of obs: 62, groups: sid:mid, 11; mid, 6
## AIC = 47.3, DIC = 1.6
## deviance = 19.5
```

```
anova(lmer.1_S3g)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##        Sum Sq Mean Sq NumDF  DenDF F value  Pr(>F)
## depth 0.32555 0.32555     1 59.999  5.0689 0.02803 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Slope of -0.00067 ± 6e-04 (95%-confidence interval)
n = 62 neurons from 6 mice

Figure 1-Supplement 3h

Relation between burst ratio FMI and direction selectivity

```
# Random intercept for series nested within mice
lmer.1_S3h = lmer(mvi_meanburstratio ~ dsi + (1 | mid/sid),
                  data = tib %>% drop_na(mvi_meanburstratio, dsi))

display(lmer.1_S3h)
```

```
## lmer(formula = mvi_meanburstratio ~ dsi + (1 | mid/sid), data = tib %>%
##     drop_na(mvi_meanburstratio, dsi))
##             coef.est coef.se
## (Intercept) -0.37     0.12
## dsi         -0.06     0.15
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid:mid  (Intercept) 0.31
##  mid      (Intercept) 0.00
##  Residual             0.16
## ---
## number of obs: 38, groups: sid:mid, 8; mid, 4
## AIC = 2.8, DIC = -16.3
## deviance = -11.7
```

```
anova(lmer.1_S3h)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##        Sum Sq   Mean Sq NumDF  DenDF F value Pr(>F)
## dsi 0.0038552 0.0038552     1 29.689  0.1443 0.7068
```

Slope of -0.057 ± 0.30 (95%-confidence interval)
n = 38 neurons from 4 mice

Figure 1-Supplement 3i

Relation between burst ratio FMI and receptive field location

```
# Random intercept for series nested within mice
lmer.1_S3i = lmer(mvi_meanburstratio ~ rfdist + (1 | mid/sid),
                  data = tib %>% drop_na(mvi_meanburstratio, rfdist))

display(lmer.1_S3i)
```

```
## lmer(formula = mvi_meanburstratio ~ rfdist + (1 | mid/sid), data = tib %>%
##     drop_na(mvi_meanburstratio, rfdist))
##             coef.est coef.se
## (Intercept) -0.18     0.13
## rfdist      -0.01     0.01
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid:mid  (Intercept) 0.21
##  mid      (Intercept) 0.02
##  Residual             0.26
## ---
## number of obs: 53, groups: sid:mid, 10; mid, 6
## AIC = 40.4, DIC = 6.9
## deviance = 18.7
```

```
anova(lmer.1_S3i)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##         Sum Sq Mean Sq NumDF DenDF F value Pr(>F)
## rfdist 0.12064 0.12064     1 42.06   1.823 0.1842
```

Slope of -0.0081 $\pm$ 0.012 (95%-confidence interval)
n = 53 neurons from 6 mice

Figure 1-Supplement 3j

Relation between burst ratio FMI and burst ratio

```
# Random intercept for series
lmer.1_S3j = lmer(mvi_meanburstratio ~ mvi_meanburstratio_raw + (1 | sid),
                  data = tib %>% drop_na(mvi_meanburstratio, mvi_meanburstratio_raw))

display(lmer.1_S3j)
```

```
## lmer(formula = mvi_meanburstratio ~ mvi_meanburstratio_raw +
##     (1 | sid), data = tib %>% drop_na(mvi_meanburstratio, mvi_meanburstratio_raw))
##                         coef.est coef.se
## (Intercept)             -0.37     0.08
## mvi_meanburstratio_raw   1.10     0.65
##
## Error terms:
##  Groups   Name        Std.Dev.
##  sid      (Intercept) 0.19
##  Residual             0.26
## ---
## number of obs: 63, groups: sid, 11
## AIC = 32.1, DIC = 18.9
## deviance = 21.5
```

```
anova(lmer.1_S3j)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##                          Sum Sq Mean Sq NumDF  DenDF F value  Pr(>F)
## mvi_meanburstratio_raw 0.19162 0.19162     1 57.228  2.8378 0.09751 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Slope of 1.10 ± 1.31 (95%-confidence interval)
n = 63 neurons from 6 mice