

Experimental mosaics studied in the Hore, Troy and Eglen (2012) paper

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1 Background

For each map, we extracted the image from the journal website, and then used our region-finding software to find the centre-of-mass of each receptive field. We then converted from pixels to microns for the final pattern. The bounding box for the parasol mosaics was taken to be the minimal rectangle including all points in the array. All points in the data files are measured in microns. The origin of the coordinates is at the top-left of the image.

```
## Define some common functions for plotting.
soma.rad <- 20/2 #20 um soma diameter.
on.col <- "red"
of.col <- "blue"
show.on <- function(pts, main) {
  symbols(pts, circles = rep(soma.rad, nrow(pts)), inch = F, asp = 1, pch = 19,
    ylim = c(1500, 0), bg = on.col, fg = on.col, xlab = "distance ( $\mu\text{m}$ )",
    ylab = "", main = main)
}
show.of <- function(pts) {
  symbols(pts, circles = rep(soma.rad, nrow(pts)), inch = F, add = T, fg = of.col,
    bg = of.col)
}
bb <- function(w, border) {
  rect(w[1], w[3], w[2], w[4], border = border)
}
```

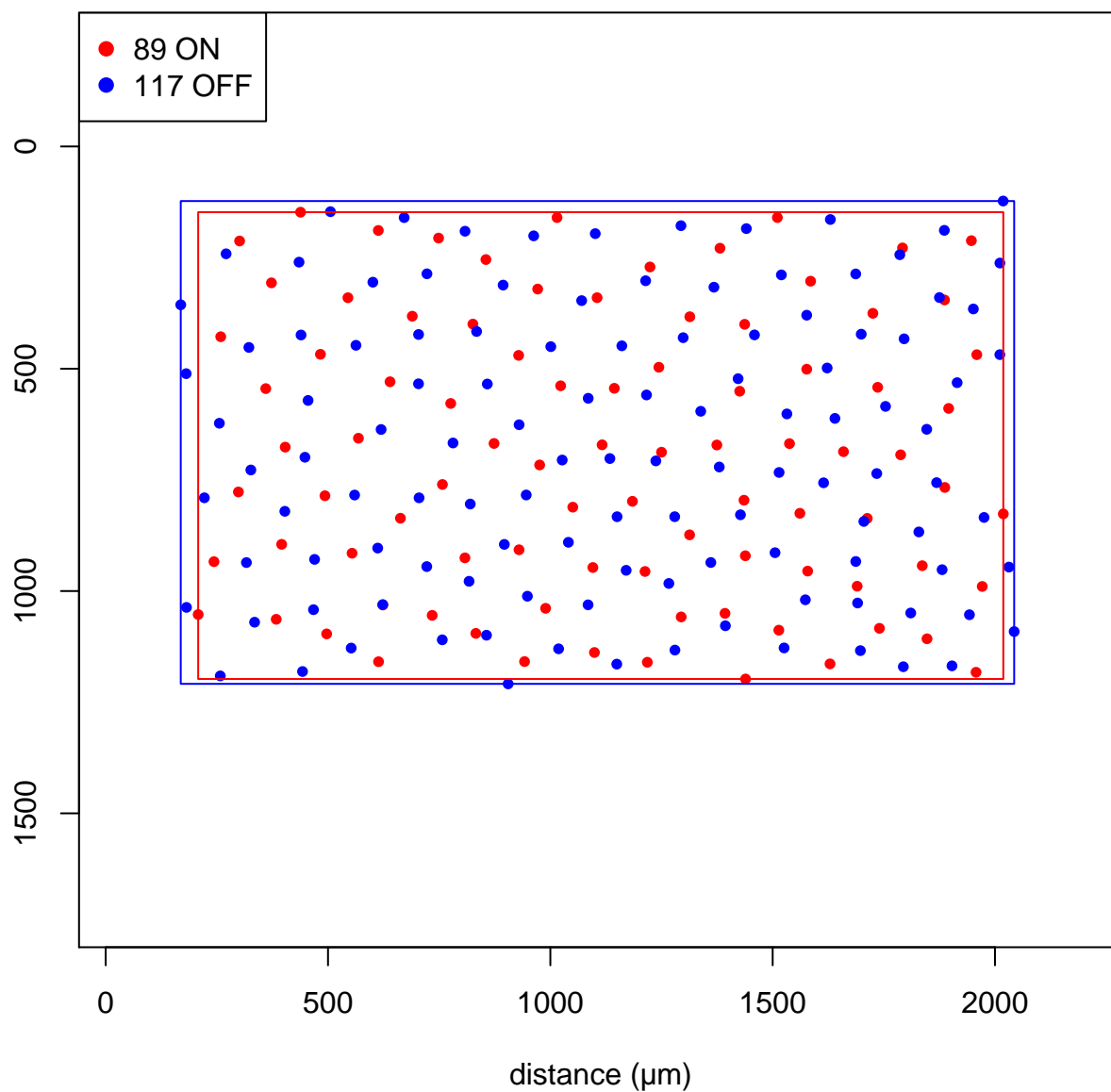
On the following pages, we show how the data can be downloaded from <http://www.damtp.cam.ac.uk/user/sje30/data/mosaics> and then plotted in R.

2 G09 parasol mosaics

G09 is the parasol mosaic from Figure 2A,B of (Gauthier et al., 2009).

```
data.dir <- "http://damtp.cam.ac.uk/user/sje30/data/mosaics/g09/"
g09.on <- as.matrix(read.table(paste0(data.dir, "g09on.dat"), header = F))
g09.on.w <- scan(paste0(data.dir, "g09on.w"))
g09.of <- as.matrix(read.table(paste0(data.dir, "g09of.dat"), header = F))
g09.of.w <- scan(paste0(data.dir, "g09of.w"))
n.on <- dim(g09.on)[1]
n.of <- dim(g09.of)[1]
show.on(g09.on, "G09")
show.of(g09.of)
bb(g09.on.w, on.col)
bb(g09.of.w, of.col)
legend("topleft", c(paste(n.on, "ON"), paste(n.of, "OFF")), col = c(on.col,
of.col), pch = c(19, 19))
```

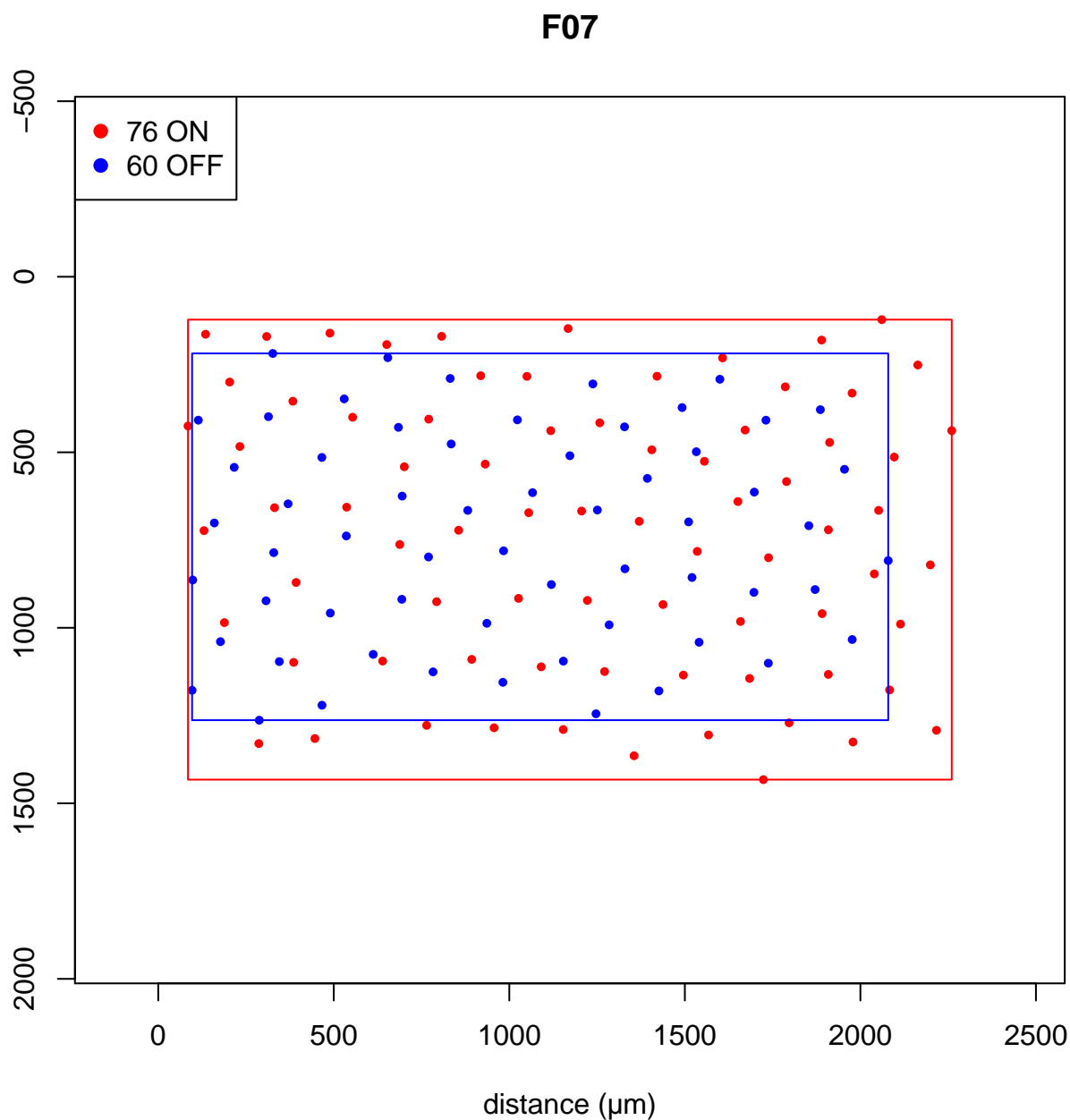
G09



3 F07 parasol mosaics

F07 is the parasol mosaic from Figure 3 of (Field & Chichilnisky, 2007). These two mosaics cannot be analysed together as there was no common bounding box; I have drawn them together below to highlight their relative sizes (off is smaller).

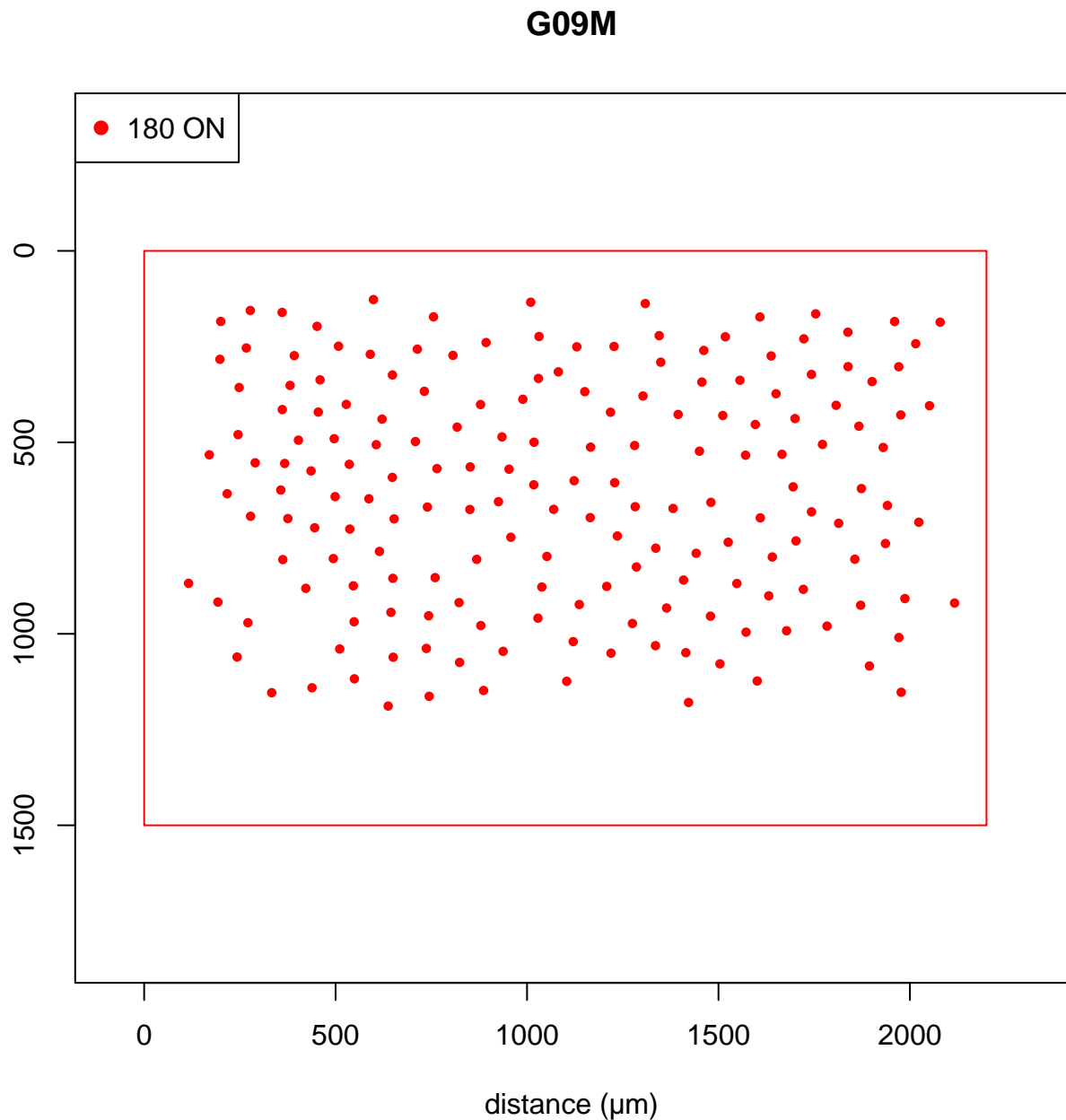
```
data.dir <- "http://damtp.cam.ac.uk/user/sje30/data/mosaics/f07/"
f07.on <- as.matrix(read.table(paste0(data.dir, "f07on.dat"), header = F))
f07.on.w <- scan(paste0(data.dir, "f07on.w"))
f07.of <- as.matrix(read.table(paste0(data.dir, "f07of.dat"), header = F))
f07.of.w <- scan(paste0(data.dir, "f07of.w"))
n.on <- dim(f07.on)[1]
n.of <- dim(f07.of)[1]
show.on(f07.on, "F07")
show.of(f07.of)
bb(f07.on.w, on.col)
bb(f07.of.w, of.col)
legend("topleft", c(paste(n.on, "ON"), paste(n.of, "OFF")), col = c(on.col,
  of.col), pch = c(19, 19))
```



4 G09 midget mosaic

G09 is the parasol mosaic from Figure 2C of (Gauthier et al., 2009). Only the on-centre mosaic was analysed, and we used a larger bounding box to simulate a larger area enclosing all observed points.

```
data.dir <- "http://damtp.cam.ac.uk/user/sje30/data/mosaics/g09m/"
g09m.on <- as.matrix(read.table(paste0(data.dir, "g09onm.dat"), header = F))
g09m.on.w <- scan(paste0(data.dir, "g09onm.w"))
n.on <- dim(g09m.on)[1]
show.on(g09m.on, "G09M")
bb(g09m.on.w, on.col)
legend("topleft", c(paste(n.on, "ON")), col = c(on.col), pch = c(19))
```



References

- Field, G. D. & Chichilnisky, E. J. (2007). Information processing in the primate retina: circuitry and coding. *Annual Review of Neuroscience* **30**, 1–30.
- Gauthier, J. L., Field, G. D., Sher, A., Greschner, M., Shlens, J., Litke, A. M. & Chichilnisky, E. J. (2009). Receptive fields in primate retina are coordinated to sample visual space more uniformly. *PLoS Biology* **7**, e1000063.