Getting Data (Part 1)

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Get/set your working directory

Roger's lectures windows, mac Andrew Jaffe's lecture notes

```
getwd()
```

```
[1] "/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1"
```

```
setwd("/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1/data")
getwd()
```

```
[1] "/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1/data"
```

Important difference with Windows:

```
setwd("C:\\Users\\Andrew\\Downloads")
```

Get/set your working directory (relative paths)

```
getwd()
```

```
[1] "/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1"
```

```
setwd("./data")
getwd()
```

```
[1] "/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1/data"
```

```
setwd("../")
getwd()
```

```
[1] "/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1"
```

Get/set your working directory (relative paths)

```
getwd()
```

```
[1] "/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1"
```

```
setwd("/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1/data")
getwd()
```

```
[1] "/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1/data"
```

Types of files data may come from

- Tab-delimited text
- Comma-separated text
- Excel file
- JSON File
- HTML/XML file
- Database

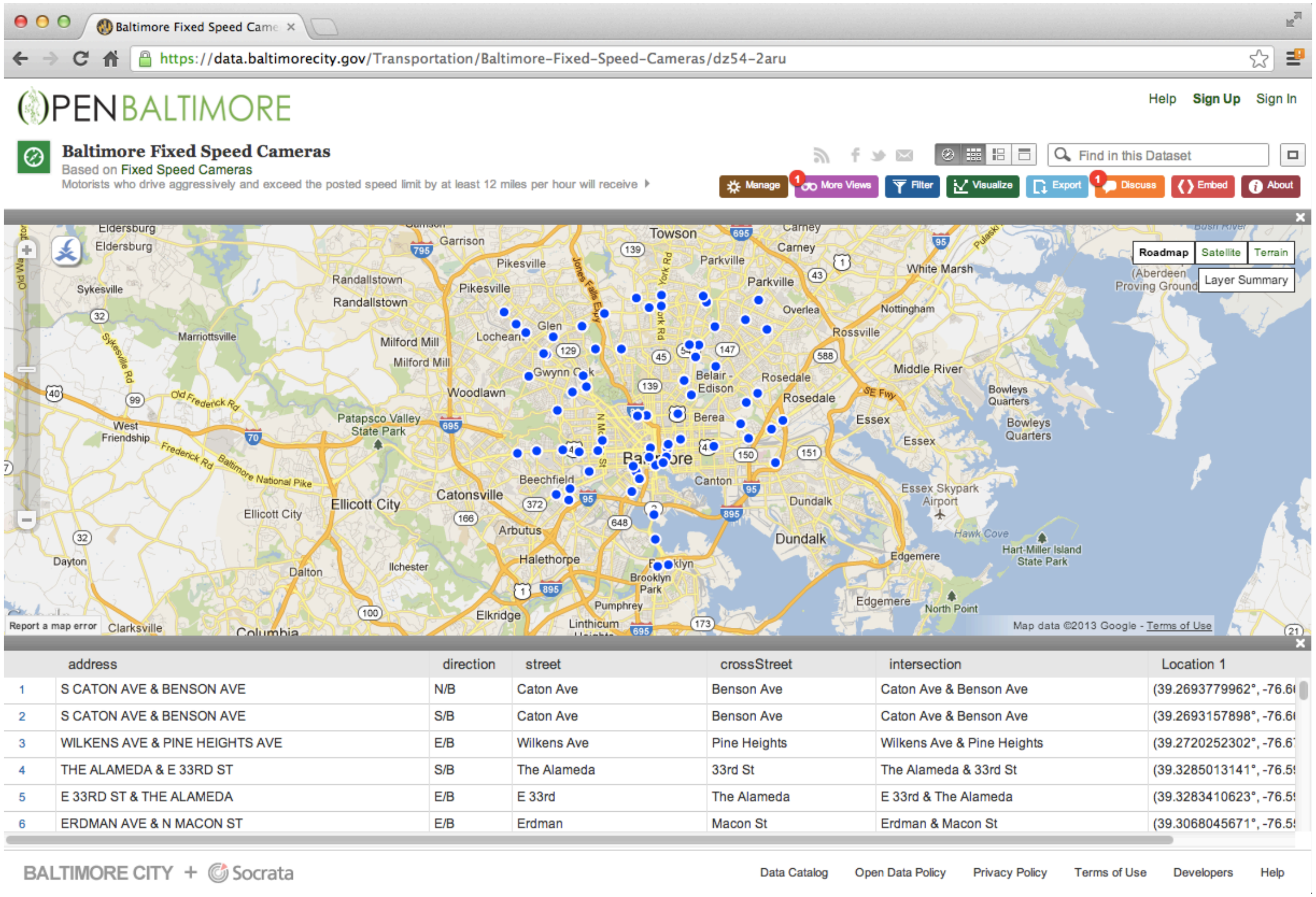
Where you can get data

- From a colleague
- From the web
- From an application programming interface
- By scraping a web page

Getting data from the internet - download.file()

- Downloads a file from the internet
- Even if you could do this by hand, helps with reproducibility
- Important parameters are *url*, *destfile*, *method*
- Useful for downloading tab-delimited, csv, etc.

Example - Baltimore camera data



Baltimore Fixed Speed Cameras

Based on Fixed Speed Cameras

Motorists who drive aggressively and exceed the posted speed limit by at least 12 miles per hour will receive

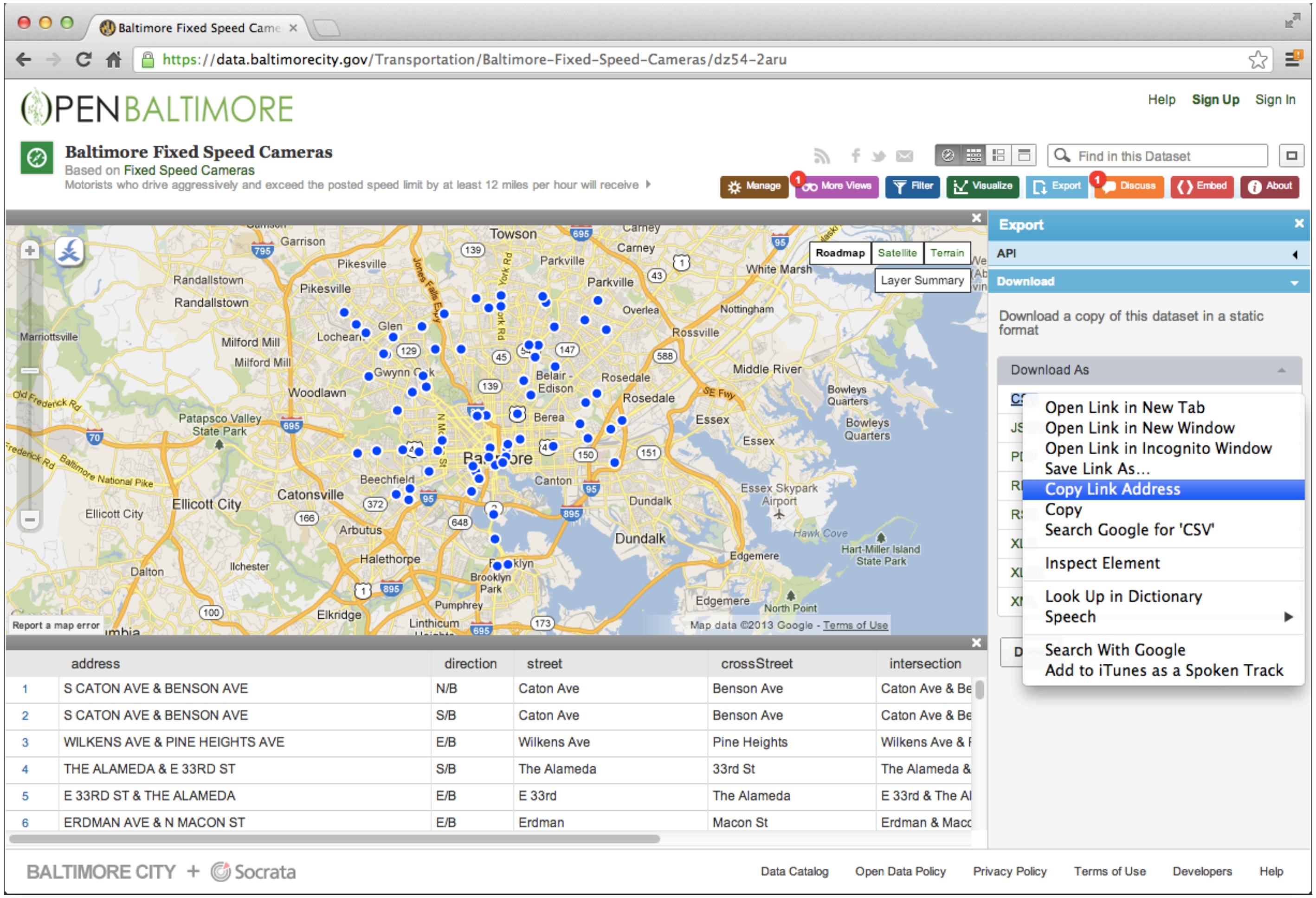
	address	direction	street	crossStreet	intersection	Location 1
1	S CATON AVE & BENSON AVE	N/B	Caton Ave	Benson Ave	Caton Ave & Benson Ave	(39.2693779962°, -76.6
2	S CATON AVE & BENSON AVE	S/B	Caton Ave	Benson Ave	Caton Ave & Benson Ave	(39.2693157898°, -76.6
3	WILKENS AVE & PINE HEIGHTS AVE	E/B	Wilkens Ave	Pine Heights	Wilkens Ave & Pine Heights	(39.2720252302°, -76.6
4	THE ALAMEDA & E 33RD ST	S/B	The Alameda	33rd St	The Alameda & 33rd St	(39.3285013141°, -76.5
5	E 33RD ST & THE ALAMEDA	E/B	E 33rd	The Alameda	E 33rd & The Alameda	(39.3283410623°, -76.5
6	ERDMAN AVE & N MACON ST	E/B	Erdman	Macon St	Erdman & Macon St	(39.3068045671°, -76.5

BALTIMORE CITY + Socrata

Data Catalog Open Data Policy Privacy Policy Terms of Use Developers Help

https://data.baltimorecity.gov/Transportation/Baltimore-Fixed-Speed-Cameras/dz54-2aru

Example - Baltimore camera data,csv



Baltimore Fixed Speed Cameras

Based on Fixed Speed Cameras

Motorists who drive aggressively and exceed the posted speed limit by at least 12 miles per hour will receive

Download a copy of this dataset in a static format

	address	direction	street	crossStreet	intersection
1	S CATON AVE & BENSON AVE	N/B	Caton Ave	Benson Ave	Caton Ave & Be
2	S CATON AVE & BENSON AVE	S/B	Caton Ave	Benson Ave	Caton Ave & Be
3	WILKENS AVE & PINE HEIGHTS AVE	E/B	Wilkens Ave	Pine Heights	Wilkens Ave & I
4	THE ALAMEDA & E 33RD ST	S/B	The Alameda	33rd St	The Alameda &
5	E 33RD ST & THE ALAMEDA	E/B	E 33rd	The Alameda	E 33rd & The Al
6	ERDMAN AVE & N MACON ST	E/B	Erdman	Macon St	Erdman & Macc

https://data.baltimorecity.gov/Transportation/Baltimore-Fixed-Speed-Cameras/dz54-2aru

Download a file from the web

```
fileUrl <- "https://data.baltimorecity.gov/api/views/dz54-2aru/rows.csv?accessType=DOWNLOAD"
download.file(fileUrl,destfile="./data/cameras.csv",method="curl")
list.files("./data")
```

```
[1] "camera.json"          "camera.xlsx"          "cameras.csv"
[4] "cameras.rda"          "camerasModified.csv"
```

```
dateDownloaded <- date()
dateDownloaded
```

```
[1] "Sun Jan 27 12:21:15 2013"
```

Some notes about download.file()

- If the url starts with *http* you can use download.file()
- If the url starts with *https* on Windows you may be ok
- If the url starts with *https* on Mac you may need to set *method="curl"*
- If the file is big, this might take a while
- Be sure to record when you downloaded.

Loading data you have saved - read.table()

- This is the main function for reading data into R
- Flexible and robust but requires more parameters
- Reads the data into RAM - big data can cause problems
- Important parameters *file*, *header*, *sep*, *row.names*, *nrows*
- Related: *read.csv()*, *read.csv2()*

Example: Baltimore camera data

```
getwd()
```

```
[1] "/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1"
```

```
cameraData <- read.table("./data/cameras.csv")
```

```
Error: line 1 did not have 13 elements
```

```
head(cameraData)
```

```
Error: error in evaluating the argument 'x' in selecting a method for
function 'head': Error: object 'cameraData' not found
```

Example: Baltimore camera data

```
getwd()
```

```
[1] "/Users/jtleek/Dropbox/Jeff/teaching/2013/coursera/week2/004gettingData1"
```

```
cameraData <- read.table("./data/cameras.csv",sep=",",header=TRUE)
head(cameraData)
```

```
                         address direction      street  crossStreet
1        S CATON AVE & BENSON AVE       N/B   Caton Ave   Benson Ave
2        S CATON AVE & BENSON AVE       S/B   Caton Ave   Benson Ave
3 WILKENS AVE & PINE HEIGHTS AVE       E/B Wilkens Ave Pine Heights
4         THE ALAMEDA & E 33RD ST       S/B The Alameda      33rd St
5         E 33RD ST & THE ALAMEDA       E/B      E 33rd  The Alameda
6
1     Caton Ave & Benson Ave (39.2693779962, -76.6688185297)
2     Caton Ave & Benson Ave (39.2693157898, -76.6689698176)
3 Wilkens Ave & Pine Heights  (39.2720252302, -76.676960806)
4     The Alameda  & 33rd St (39.3285013141, -76.5953545714)
```

Example: Baltimore camera data

read.csv sets *sep=","* and *header=TRUE*

```
cameraData <- read.csv("./data/cameras.csv")
head(cameraData)
```

```
                         address direction      street  crossStreet
1       S CATON AVE & BENSON AVE       N/B   Caton Ave   Benson Ave
2       S CATON AVE & BENSON AVE       S/B   Caton Ave   Benson Ave
3 WILKENS AVE & PINE HEIGHTS AVE       E/B Wilkens Ave Pine Heights
4        THE ALAMEDA & E 33RD ST       S/B The Alameda      33rd St
5        E 33RD ST & THE ALAMEDA       E/B      E 33rd  The Alameda
6
1     Caton Ave & Benson Ave (39.2693779962, -76.6688185297)
2     Caton Ave & Benson Ave (39.2693157898, -76.6689698176)
3 Wilkens Ave & Pine Heights  (39.2720252302, -76.676960806)
4     The Alameda  & 33rd St (39.3285013141, -76.5953545714)
5      E 33rd  & The Alameda (39.3283410623, -76.5953594625)
6         Erdman  & Macon St (39.3068045671, -76.5593167803)
```

read.xlsx(), read.xlsx2() {xlsx package}

- Reads .xlsx files, but slow
- Important parameters *file*, *sheetIndex*, *sheetIndex*, *rowIndex*, *colIndex*, *header*
- read.xlsx2() relies more on low level Java functions so may be a bit faster

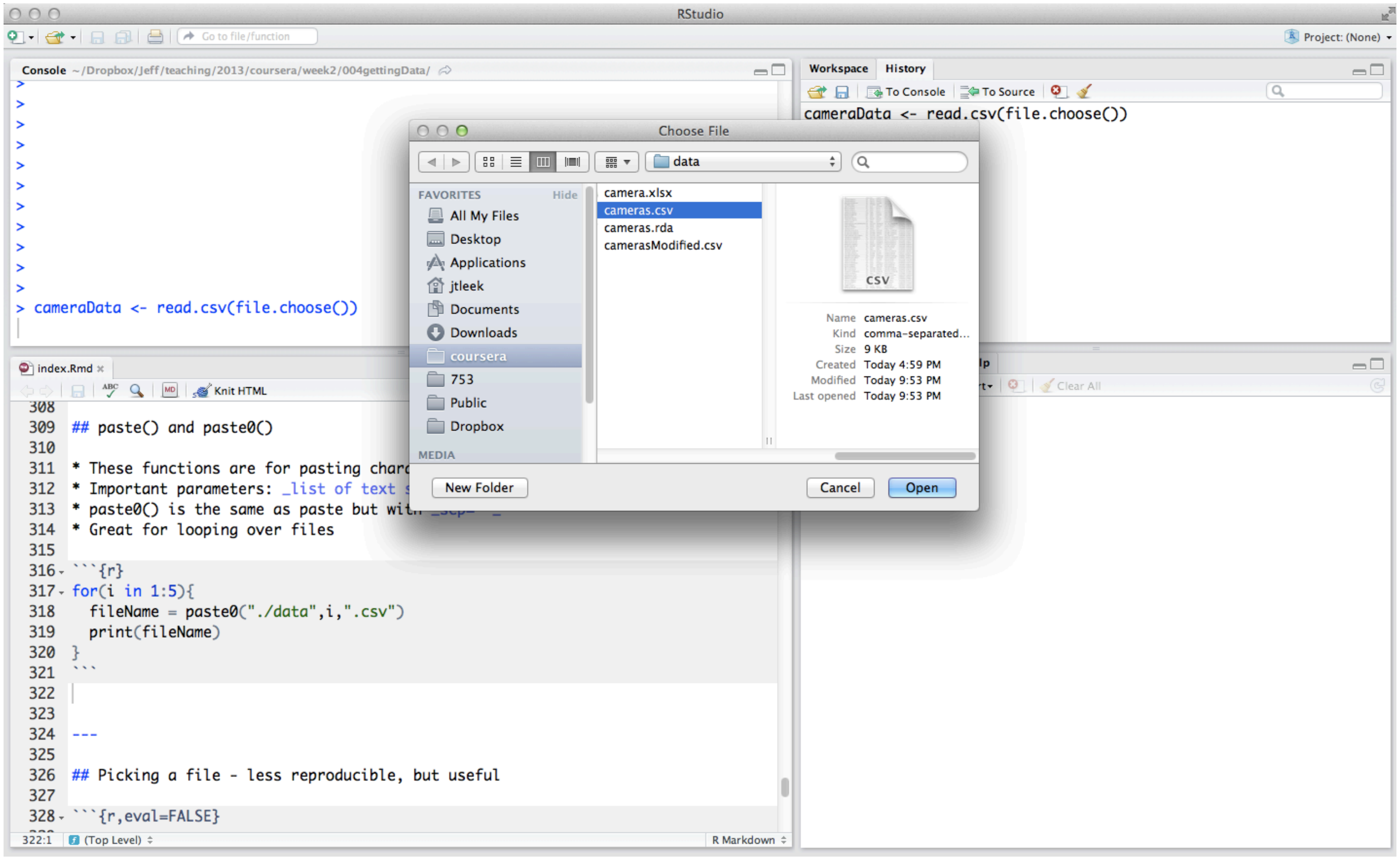
read.xlsx() - Baltimore camera data

```
library(xlsx)
fileUrl <- "https://data.baltimorecity.gov/api/views/dz54-2aru/rows.xlsx?accessType=DOWNLOAD"
download.file(fileUrl,destfile="./data/camera.xlsx",method="curl")
cameraData <- read.xlsx2("./data/camera.xlsx",sheetIndex=1)
head(cameraData)
```

```
                         address direction      street  crossStreet
1       S CATON AVE & BENSON AVE       N/B   Caton Ave   Benson Ave
2       S CATON AVE & BENSON AVE       S/B   Caton Ave   Benson Ave
3 WILKENS AVE & PINE HEIGHTS AVE       E/B Wilkens Ave Pine Heights
4        THE ALAMEDA & E 33RD ST       S/B The Alameda      33rd St
5        E 33RD ST & THE ALAMEDA       E/B      E 33rd  The Alameda
6
1     Caton Ave & Benson Ave (39.2693779962, -76.6688185297)
2     Caton Ave & Benson Ave (39.2693157898, -76.6689698176)
3 Wilkens Ave & Pine Heights  (39.2720252302, -76.676960806)
4     The Alameda  & 33rd St (39.3285013141, -76.5953545714)
5      E 33rd  & The Alameda (39.3283410623, -76.5953594625)
6         Erdman  & Macon St (39.3068045671, -76.5593167803)
```

Picking a file - less reproducible, but useful

```
cameraData <- read.csv(file.choose())
```



```
> cameraData <- read.csv(file.choose())
```

History:

```
cameraData <- read.csv(file.choose())
```

Files in data: camera.xlsx, cameras.csv, cameras.rda, camerasModified.csv

Name	cameras.csv
Kind	comma-separated...
Size	9 KB
Created	Today 4:59 PM
Modified	Today 9:53 PM
Last opened	Today 9:53 PM

~~~
## paste() and paste0()

* These functions are for pasting char
* Important parameters: _list of text s
* paste0() is the same as paste but wit
* Great for looping over files

```{r}
for(i in 1:5){
  fileName = paste0("./data",i,".csv")
  print(fileName)
}
~~~

Picking a file - less reproducible, but useful

```{r,eval=FALSE}
```