

DAY 3

STAN WORKSHOP

MORE RSTAN

TEST GRADIENT MODE

- ▶ Compares gradients computed using:
 - ▶ automatic differentiation
 - ▶ finite differences

- ▶

```
fit5 <- stan("eight_schools_5.stan",  
            data = schools_dat,  
            test_grad = TRUE,  
            chains = 1)
```

- ▶ When does this help?

OPTIMIZATION

- ▶ Use L-BFGS to find the penalized maximum likelihood estimate

- ▶

```
o <- optimizing(fit5@stanmodel,  
               data = schools_dat)
```

- ▶

```
o <- optimizing(fit5@stanmodel,  
               data = schools_dat,  
               hessian = TRUE)
```


LOOKUP

- ▶ Finds a Stan function that is similar to R function

- ▶ `lookup(rnorm)`
- ▶ `lookup(as.vector)`
- ▶ `lookup(dpois)`

WHAT WE'VE DONE

WHAT WE'VE DONE

- ▶ Written Stan programs (and iterated!)
 - ▶ linear model
 - ▶ Poisson + exposure and predictors
 - ▶ Poisson + zero inflation + truncation
 - ▶ Hierarchical model:
complete pooling, no pooling, partial pooling
- ▶ Ran Stan programs in rstan
- ▶ Diagnosed problems
 - ▶ few divergent errors: increase `adapt_delta` (e.g. 0.9, 0.99)
 - ▶ non-centered reparameterization

HELP?!?!?

HOW TO GET HELP

1. Users mailing list. Google Group: stan-users
<https://groups.google.com/forum/?fromgroups#!forum/stan-users>
2. Stan Manual
<http://mc-stan.org/documentation/>
3. Example models
<https://github.com/stan-dev/example-models>

GENERAL COMMENTS

- ▶ Start simple; build up.
- ▶ Any model can be written in Stan. (almost)
- ▶ If you're struggling, ask on the users list.
- ▶ Treat Stan programs as code
 - ▶ Use version control for the Stan program
 - ▶ Consistent formatting helps
- ▶ We take volunteers!