

Stan for the people

Two day introductory workshop
on Bayesian modeling

McGill University
January 26th 2019



mc-stan.org

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Concluding remarks

What we covered

- ▶ Box's loop and general framework for modeling
- ▶ The *statistical* model is a data generating process
- ▶ Posterior based inference
- ▶ Modern methods to compute posterior distributions

What we covered

- ▶ Writing and fitting a model in Stan
- ▶ Diagnosing the inference algorithm
- ▶ Criticizing our model
- ▶ Constructing a new model by:
 - ▶ revising the data generating process
 - ▶ reparametrizing the model

What we didn't cover

- ▶ A more in depth conversation on HMC
- ▶ Logistic models with multiple categories
- ▶ Gaussian processes
- ▶ Differential equations based models
- ▶ Time series models
- ▶ and many more examples.

These can be found in the *Stan book*, see https://mc-stan.org/docs/2_18/stan-users-guide/index.html

Where can I learn more?

- ▶ The Stan book
- ▶ Contributions to the Stan Conference:
<https://github.com/stan-dev/stancontalks>
- ▶ Online tutorials: <https://mc-stan.org/users/documentation/tutorials.html>
- ▶ Betancourt's case studies:
<https://betanalpha.github.io/writing/>
- ▶ Bill Gillespie's tutorials:
metrumresearchgroup.com/course/brief-introduction-bayesian-modeling-using-stan/
- ▶ Dave Blei's course on graphical models:
<http://www.cs.columbia.edu/~blei/fogm/2018F/>

Stan by the people, for the people

- ▶ Stan is open source: <https://github.com/stan-dev>
- ▶ Contributing new functions to Stan:
<https://github.com/stan-dev/stan/wiki/Contributing-New-Functions-to-Stan>

The Stan ecosystem

- ▶ RStanArm - applied regression modeling
mc-stan.org/users/interfaces/rstanarm
- ▶ BRMS - generalized nonlinear multivariate multilevel models
cran.r-project.org/web/packages/brms/index.html
- ▶ Prophet - forecasting at scale
research.fb.com/prophet-forecasting-at-scale/
- ▶ Torsten - pharmacometrics modeling
metrumresearchgroup.github.io/Torsten
- ▶ . . .

Stay tuned for Stan Con 2019.

Check out *Stan, this month*, our new newsletter.

Other probabilistic programming languages

- ▶ PyMC3 - docs.pymc.io
- ▶ Edward - edwardlib.org

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