

STATISTICAL RETHINKING WINTER 2019  
HOMEWORK, WEEK 1

**When is homework due?** Homework is due each Friday. So for this first homework assignment, it'll be due on December 14. You are welcome to work in groups. Just please turn in your individual completed answers.

**Where is homework due?** Email it to `richard_mcelreath@eva.mpg.de` with the subject **Stat Rethinking Homework Week 1**. The preferred format is PDF or a plain text script file (.Rmd or .R). Please do not turn in a Microsoft Word document—Please just convert it to PDF first.

1. Suppose the globe tossing data had turned out to be 8 water in 15 tosses. Construct the posterior distribution, using grid approximation. Use the same flat prior as before.
2. Start over in 1, but now use a prior that is zero below  $p = 0.5$  and a constant above  $p = 0.5$ . This corresponds to prior information that a majority of the Earth's surface is water. What difference does the better prior make? If it helps, compare posterior distributions (using both priors) to the true value  $p = 0.7$ .
3. This problem is more open-ended than the others. Feel free to collaborate on the solution. Suppose you want to estimate the Earth's proportion of water very precisely. Specifically, you want the 99% percentile interval of the posterior distribution of  $p$  to be only 0.05 wide. This means the distance between the upper and lower bound of the interval should be 0.05. How many times will you have to toss the globe to do this? I won't require a precise answer. I'm honestly more interested in your approach.