## The entropy of the 1 x2 LEGO BRIck

## Søren Eilers

Many years ago, I found that the LEGO Group was in error when stating in their promotional material that there were 102981500 different ways of combining six $2 \times 4$ LEGO bricks. I managed to compute the correct number, roughly 9 times larger, but also started realizing that there are many beautiful and challenging mathematical problems associated to the company's products.

One such problem is determining the entropy of the brick of a given size, thus specifying the speed of which the number of buildings grow as the number of bricks tend to infinity. Even for the smallest nontrivial brick, we have only partial insight, but with care some questions of this type can be translated into questions already extensively studied. It is particularly interesting to understand what happens when one varies the dimensionality of the problem, and study the growth of the number of LEGO buildings in other dimensions than three.

