

**P008** A network of orthogonal ribosome•mRNA pairs  
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Synthetic Biology promises the ability to programme cells with new functions. Simple oscillators, switches, logic functions, cell-cell communication and pattern forming circuits have been created, by the connection of a small set of natural transcription factors and their binding sites in different ways to create different networks of molecular interactions. However, the controlled synthesis of more complex synthetic networks and functions will require an expanded set of functional molecules with known molecular specificities. Here, we tailor the molecular specificity of duplicated *E. coli* ribosome•mRNA pairs with respect to the wild-type ribosome and mRNAs to produce multiple orthogonal ribosome•orthogonal mRNA pairs. In these pairs the ribosome exclusively translates the orthogonal mRNA and the orthogonal mRNA is not a substrate for cellular ribosomes. We predict and measure the network of interactions between these orthogonal pairs, and show that orthogonal ribosome•mRNA pairs can be used to post-transcriptionally programme the cell with Boolean logic.