Deriving the AdS$_3$/CFT$_2$ Correspondence

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The AdS/CFT correspondence still retains its magical flavour after two decades because it equates two apparently unrelated theoretical entities. Namely, a theory of quantum gravity on Anti de Sitter (AdS) spacetimes and conformal field theories (CFT) on their boundary. In these talks we will take some steps towards a nuts and bolts understanding of how this connection really works. We will do this in the context of a specific example that relates a tensionless limit of an AdS$_3$ string theory with a 2d CFT known as the symmetric product orbifold CFT. First we argue that the spectrum of physical states nontrivially agrees on both sides of this duality. We then go on to give arguments which establish how we can recast all physical correlators on the string theory as boundary correlators of the 2d CFT. This bypasses any need for explicit calculation but instead makes manifest the relation between the two sets of quantities. The resulting picture suggests an underlying topological string as the right starting point for a perturbative expansion. This may be a universal feature even of the higher dimensional examples of the AdS/CFT duality and in the spirit of an old program to recast large N perturbative field theories as string theories.