

## The Stage

### *Capturing dreams & brains*

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Great performances capture us emotionally, transporting us to a world of the imagination. As a neuroscientist, I want to know how this works. Most neuroscientists study one thing at a time – memory or language or visual perception – but for theatre we need all of these, plus that magic of the interaction between the actors and between actors and audience. So how can we possibly create a neuroscience of theatre?

The answer begins five years ago, when I started working with Kelly Hunter and Flute theatre, who performances of Shakespeare for young people with autism. In these unique events, children and actors co-create the elemental interactions of the play – acts of looking or fighting; loving or avoiding - which retain the truth of the text. This gives the autistic children new ways to engage with other people and with long-term benefits for confidence and social skills. But as a neuroscientist, I wanted to know more – what happens when children and adults engage in these unique theatre games and how does this change their brain?

A recent neuroimaging study of actors asked a group of drama students trained in method acting to lie in an MRI scanner and answer questions such as ‘would you tell your parents if you fell in love?’, either from their own point of view or from the point of view of Romeo or Juliet. They found much less brain activity in the frontal cortex when the actors were taking on the role of Romeo or Juliet, and concluded that acting can change patterns of brain activity. However, lying still in the dark confines of an MRI scanner does not have much in common with performance on stage in front of an audience. If we really want to understand the brain of an actor, we need to see it in action.

New wearable brain imaging technologies now give us the chance to examine this kind of question. This technology, called functional near-infrared spectroscopy (or fNIRS for short) works by shining infrared light into the brain to measure how the blood flows in the cortex. It is mainly used for monitoring premature babies in intensive care, but the newer more sensitive machines can also record brain activity in adults. So far, we have recorded from actors in rehearsal performing their parts, and we can see that performing the same scene always gives the same brain pattern, but that people who approach the role differently may have different brain patterns. More critically, we can test if taking on a role changes your sense of self, by looking for changing patterns of activity in the frontal cortex.

Our data collected so far has been in rehearsals, but theatre is best with an audience. So on May 15 and 16<sup>th</sup> at the Bloomsbury theatre, for the first time ever, we will be performing our neuroimaging research live on stage. As Flute theatre dive into the dreamworld of a midsummer night, the neuroscience team will capture the responses of the audience and the actors in a way that has never been attempted before. We hope to find out how patterns of brain activity in a live performance are different to doing the same actions in rehearsals, and to test if taking on a role changes the actor’s sense of self. Moving between science and theatre, this performance deconstructs *The Dream* in order to forge a new understanding of the neuroscience of theatre. We invite you to join us in creating it.

<https://www.thebloomsbury.com/event/run/18138>