Singing the body electric

Emotion-reading technology gives **Tod Machover**'s opera an animatronic stage with heart

Composer and inventor Tod Machover has created innovative music technology for everyone from Yo Yo Ma to Prince, as well as the technology behind *Guitar Hero* and *Rock Band*. He is also the head of the Opera of the Future group at MIT's media lab. Ada Brunstein sits down with him to discuss his latest creation, *Death and the Powers* – a high-tech opera featuring singing robots and musical chandeliers

What is *Death and the Powers* all about?
When I started working on it, I was thinking about my parents getting older and how much my children didn't know about them. I began thinking about forms in which our legacies can be shared. The opera is about Simon Powers, a businessman and inventor obsessed with his legacy. He invents The System, a way for him to download his persona into his environment. The story is about how his loved ones react to that.

How did the project begin?
Kawther Al-Abood, head of the Board of the Monte Carlo Opera, showed up at my office and said she was interested in a project that would make people think differently about opera. It started me thinking about how the physicality of the stage can not only help tell the story but also make you feel closer to the performers. In live performance these days, technology tends to do the opposite. So one impetus was, how can we use technology to enhance human presence and make the physical environment as expressive as possible?

Can a robotic chandelier capture the subtleties of human emotion?
How did you accomplish that?
Our lab developed an innovative set of techniques that we call Disembodied Performance. They are more personalised than anything we've done. *Guitar Hero* and *Rock Band* were about access; about letting everyone play music even if they haven't studied an instrument. But what they don't have is the ability to reflect individual expression, which happens through the nuances of, for example, how you touch an instrument. Disembodied Performance is about capturing nuance. When the actor playing Simon is backstage singing, he is monitored by computer vision, vocal analysis and a host of sensors that measure everything from posture to muscle tension to breathing patterns. Together they capture his emotional state, which is infused into the stage through lighting, images, sound and robotics. The set emotes.

"The actor's emotional state is infused into the stage through lighting, images, sound and robotics"

So who is the character: a person or the technology?
It's not about the technology. In fact, I think most people don't realise how cool and intricate the technology actually is. Simon Powers is a very strong character, even though he is only physically present in the first and last scenes. In between, he is in The System. He is the stage, the chandelier, the robots. So if we've done it right, you come to care about Simon through the technology.

It's a very emotional, personal opera about relationships and family. The character I hope people will care about is Miranda, Simon's daughter. In my view, it's her story. She comes to believe that The System is not her father – that ultimately she can't touch him or see him, that he's not really there.

The character who is able to communicate with Simon is his third wife because they are deeply in love. There's a scene where Simon is in the chandelier, and it comes down to envelop her (pictured). It becomes a love scene; his voice is vibrating through the chandelier and she's playing the chandelier and singing. Of course I tried to convey the subtlety and specificity of character through the music itself, from twists of melody to rhythms that explode.

What are you working on next?
I just returned from England where we applied the Disembodied Performance techniques to a cellist by measuring the expression of the bow. It's the best system I've made so far for every nuance of cello playing – it's really exciting. The cellist is surrounded by towers of LEDs, and the music translates into undulating lights. So we're taking the opera's technology and putting it into the next generation of making instruments.

Over the next couple of years I'll also be working on a system called Personal Opera, a software environment through which people can make musical and visual narratives about themselves or their loved ones. ■

DEATH AND THE POWERS/MIT

PROFILE
Tod Machover is director of the Hyperinstruments and Opera of the Future groups at the Massachusetts Institute of Technology's Media Lab. He is also a visiting professor at the Royal Academy of Music in London