**Smell Reproduction for 4-D Movies**

Brian Lewis | David Garcia | Mingming Wang

**Introduction**
We are developing a smell reproduction system as an optional add-on device for home theaters and mobile devices. The system will output smells that correspond to images seen on the screen.

**Use Examples:**
- Combined with video for 4-D movies
- Smell-enabled advertisements
- Tablet add-on

**Market Research**

**Home theater applications**
People tend to spend more on new technologies for home entertainment. The global TV & video market is shown below:

[Graph showing market growth]

**Mobile applications**
Our device will also easily fit in the niche of tablet accessories. The global tablet market has a $57 billion value and is expected to grow into a $124 billion in 2015.

**Technology Overview**
Our system consists of three main parts, a display, a smell reproduction system, and circuitry to control both systems.

**System Design**
The smell reproduction application running on the display device sends commands over a Bluetooth link between the display and the microcontroller of the smell output device. These commands comprise of simple instructions of what smell and how long to transmit the smell. The smells are then outputted by the PDMS device and blown at the user via a small fan.

**PDMS Smell Device Design**
The smell output device consists of small PDMS cavities with resistive heaters embedded within the cavities. Outside the cavities, the small heaters are connected to an array of relays controlled by microcontroller. When voltage is applied to the heaters, the liquid smells heat up, expand, and are released through the small pore that they were injected into the PDMS cavities with.

[Diagram showing system components: Tablet or Visual Display, Bluetooth Module, Arduino Microcontroller, User, PDMS Smell Devices, Control Circuitry, PDMS Device with labels: PDMS Fill 1, PDMS Fill 2, Output Pore, Cavity filled with Smell, Resistive Heater, Thermocouple]