

## **Report to the Institute of Physics Scotland**

### **Sponsorship of British Science Association, Tayside & Fife Branch for Public Lecture and School Workshops on robotics in National Science & Engineering Week 2011.**

A Public Lecture held on Tuesday 15 March at University of Dundee, D'Arcy Thompson Lecture Theatre at 7.00 pm titled *Robots and you*, was given by Professor Barbara Webb, Institute of Perception, Action & Behaviour at the University of Edinburgh.

Professor Webb first explored the interesting boundary between what is perceived as intelligence and the capabilities of computers (i.e. solving chess games), and then explained how they have a bearing on the construction of mobile robots capable of interacting with complex environments and people. She demonstrated the problems encountered when designing and building humanoid and animal-like robots by presenting 'Nao' and 'Aibo', respectively, robots with considerable character and aptitude, but several obvious deficiencies. For example, both robots could return to a standing position after being placed up-side-down, and could follow a ball of a single specified colour, but could only walk clumsily towards a target directed by mounted cameras and sensors.

This was a most engaging public performance by the skilled speaker who responded positively to continuous questions during her delivery, and afterwards in the formal Q&A session. Public engagement about serious science topics is often at its best when the entertainment content is high – on this basis the lecture scored highly and received many positive remarks from audience members, many of whom stayed on to speak to professor Webb personally.

### **School Workshops at Forfar Academy, Wednesday 16 March.**

Professor Webb ran two 1.5-hour workshops on robots in the school assembly hall under the supervision of Ms Rhona Goss, Deputy Head Teacher and lead teacher in Physics. The first Workshop for the 3<sup>rd</sup>-Year Physics class contained 36 pupils, and the second Workshop for 1<sup>st</sup>-Year General Science pupils was attended by 48 pupils. Professor Webb first engaged pupils in a discussion about what constitutes a robot: images of industrial robots, driverless cars, and animals and toys opened the topic with an abundance of pupils' participation. Pupils were then challenged with a simple wiring diagram that gave them options to connect a light sensor to a motor that drives a wheel – by changing the connections they could decide how the robot should respond to light. The classes were then divided into small groups and each group given an assembly kit and asked to build a robot that could either follow a torch-light, or be repelled by it. Robots were soon running around the assembly hall to everyone's satisfaction. Finally the classes were allowed to interact with 'Nao' and 'Aido'. Professor Webb is a most engaging teacher and she was determined that each child gained something to remember from this novel experience. The classes were supervised by technicians and available teachers, and Professor David Bradley from the Tayside & Fife Branch offered guidance and support where requested.

## **Letter of appreciation from Forfar Academy for Workshops**

“Robotics workshop

I would like to record the appreciation of Forfar Academy staff for the workshop which you facilitated on 16<sup>th</sup> March. Barbara Webb did a superb job at communicating her work to the pupils, and not only maintained their interest, but enthused them with her presentation. The pupils were entirely engaged in the practical session, and were appropriately challenged by the activity.

A striking feature of Barbara’s presentation was that her work is interdisciplinary, and requires specialist input from a number of disciplines. This resonates very well with Curriculum for Excellence, where there is a strong emphasis on using specialist knowledge within interdisciplinary contexts.

Some follow-up work was done with some of the classes, where we looked in more detail at the sensors and stimuli through which robots interact with the world, and this gave the opportunity to link the presentation in a more concrete way to the pupils’ work in physics and science.

I was particularly pleased to see a high-profile event in school where the BSA and IoP were presented very publicly in such a positive light. I would like to extend our thanks to the BSA and to the IoP for providing funding for the event, and I hope that similar events might follow!

Rhona Goss  
Depute Head Teacher  
Forfar Academy”