“Self- Replicating Machines – The End of Shopping, Waste & Industry?”
Dr Adrian Bowyer
University of Bath

Dr Bowyer began by describing “RepRap” which is a free 3-dimensional printer capable of printing solid plastic objects. Since about 50% of the components are made of plastic and can be printed by RepRap itself, it can be considered as a self-replicating machine. High-tech printing machines are available from about £12,500 but are not used to self-replicate. RepRap can be built for about £300 plus the cost of the plastic components.

Once you have RepRap you can print a wide range of plastic components including parts for another machine to give to a friend. The maximum size of individual components is 200 x 200 x 140mm and the print rate is about 19ml/hour. The preferred plastic is polylactide - a biodegradable thermoplastic derived from cornstarch.

Components can be designed in-situ although many designs are freely available on the Internet e.g. http://thingiverse.com. Dr Bowyer showed several examples ranging from a simple coat hook to a complex gear wheel, all made with a honeycomb structure to give strength and light weight.

Whereas manufacture of high volumes of small plastic components traditionally involves an expensive machine tool used with big machinery, Dr Bowyer suggested that it should be possible to produce similar high volumes by using multiple RepRaps. RepRap can also use recycled thermoplastics and can thus reduce waste. An example given was a pair of plastic sandals made from recycled milk cartons

Work is continuing on new developments that would enable the RepRap to generate up to 80% of its own components and also on alternative materials such as electrical conducting plastics, silicones and ceramics.

Dr Bowyer ended the lecture with a practical demonstration of RepRap in action.

More details on RepRap can be found on http://reprap.org

Given on Wednesday 14 July 2010 at the Royal Agricultural College.