

BA Festival of Science in York, 2007

The x-change, Thursday 13 September



Speakers:

- **Dr. Philip Ball**, science writer
- **Amanda Chmura**, NOISEmaker, University of Bath
- **Dr Roberto Trotta**, Charles Lyell Award winner, Oxford University
- **Professor Chris Budd**, University of Bath
- **Professor Robin Wilson**, The Open University
- **Dr Karen Spencer**, Charles Darwin Award winner, University of Glasgow
- **Professor Peter Styring**, University of Sheffield

Host: **Sue Nelson**

The final night of the x-change kicked off with Philip Ball, author of "Critical Mass: How One Thing Leads to Another". He invited us to ponder whether there are physical laws influencing society just as they govern the universe. For example, are there physical laws at work when we observe the movement of people in a given social environment, such as a bar, or when we make collective decisions? If these laws do exist, Dr Ball proposed we must decide what to do with them.

NOISEmaker Amanda Chmura followed. A PhD student from the University of Bath who designs catalysts for making biodegradable plastics, Amanda gave an enlightening demonstration of how hydrogen peroxide, potassium iodide and just a dash of washing-up liquid can form a bubbling, volcanic eruption... or, one big foamy mess! The demonstration was accompanied by much 'oooo-ing' and 'ahhh-ing' and luckily no disastrous slips on the way to the bar.

Next came the animated cosmologist, Roberto Trotta, who posed the profound question of whether our existence is the result of blind chance or some deeper, unknown structure in the laws of physics. Dr Trotta reminded us that a vast proportion of the known universe remains an enigma, with 25% consisting of dark matter and 75% of dark energy. He went on to suggest the possibility of a 'multiverse'; what if there exists not just one universe but a collection of them, in which natural, physical laws differ from place to place?! The audience were left wondering why it is that circumstances on earth are 'just right' for life to arise and evolve.

Following Dr Trotta, mathematicians Leonhard Euler and Johann Bernoulli (Chris Budd and Robin Wilson in rather comical disguise) entertained us with the history of these characters' influential achievements. We learned how Euler, with Bernoulli as his mentor, contributed to the geometry of a circle, equations of mechanics, differential equations and the motion of the moon, as well as the vital study of prime numbers. Euler has been heralded as providing one of the most fundamental mathematical equations of all time, $e^n + 1 = 0$

Karen Spencer brought us 'chick chat' and revealed how song has shown itself to be a powerful, sexually selective trait amongst birds. Dr Spencer informed us that there are striking similarities in how birds acquire their song and humans acquire speech. Similarities in brain structures between humans and birds could actually help us understand how vocal learning might have evolved via Darwin's theory of natural selection. There are even birds who exhibit regional accents, such as the starling in the UK!

Peter Styring, whose interests lie in engineering science and sports, introduced the scientific development of a 'self-waxing' ski that could aid performance on the slopes. Crudely speaking, he explained, wax is emitted from tiny tubes at the base of the skis which acts as a lubricant, resulting in faster movement. Professor Styring hopes to develop this novel type of ski so it can be effectively used for skiing 'moguls'; a succession of bumps in the terrain.

Finally, the *perspectives* poster competition winners were announced. Winning top prize, Marco Columbo of the University of Edinburgh received the grand sum of £750 for his poster "Optimisation: the science of the best"! To see his poster, visit www.the-ba.net/perspectives.

Camilla Tham