

Article from interview with Professor Brent – By Tasnim Hossain

ANU is filled with world-class researchers. We know that well, it is the reason students come. That and the first year guarantee. But with academic colleges separating degrees and disciplines, it is difficult for people in other areas to be able to put names and faces to these “world-class researchers”. Professor Richard Brent is one of these. Only without the ironic quotation marks. After spending a number of years at Oxford, he returned to Canberra in 2005 to take up an appointment at ANU, continuing a relationship which was already 25 years old. His professorship is interesting because it is between the Colleges of Engineering and Computer Science and of Physical and Mathematical Sciences. Having moved between departments and worked alongside researchers from different areas, Professor Brent’s work sits comfortably astride this disciplinary divide. His work today often deals with mathematics we come across directly or indirectly everyday, like credit card encryption and the development of computer software.

Professor Brent’s focus is on research, although he concedes that often in mathematics finding a new problem to solve can be as hard, if not harder, than solving it. Creativity, an aspect that many might not associate with mathematics or computer engineering, is also important in order to be able to think outside the box to find solutions to problems like fixing new programs. Professor Brent has also worked extensively with other researchers; for any maths student reading this, he has a solidly respectable Erdős number of 2. For him, working with researchers in different areas of engineering, mathematics or the sciences is a complementary process. According to Professor Brent, the key to a successful partnership is communication, with process of working collaboratively changing dramatically with the development of the internet. He spoke of having several letters in transit from either side of the Atlantic at any one time when collaborating with others before the advent of such technology. Today, the internet has revolutionised the way that researchers work together, with instant online communication rapidly superseding the written documentation of letters.

For Professor Brent, teaching is a way to organise knowledge and pass it on to people who don’t necessarily have a strong background in the area, and speaks well of ANU’s good researcher-to-student ratio. In fact, he has presented knowledge to a range of audiences, from his peers, to postgraduates and later-year undergraduates, to Year 11 and 12 students taking extension maths courses at ANU. Indeed, much of first-year maths teaching is centred on equipping students for other fields, such as statistics or physics. The reality is that there are few openings for mathematicians in academia. Professor Brent asserts the need for new generations of mathematicians to understand the established knowledge and to go on to create new knowledge even though it is a discipline where knowledge dates much slower than in others. Despite this, there have been great leaps made with the rise of applied and computational mathematics and with the internet, for example by connecting volunteers globally in the hunt to discover new Mersenne prime numbers used by Professor Brent in his work. Indeed the historical inroads made into applied mathematics can be seen in the example of Bletchley Park’s breaking of the Enigma code during the Second World War, as Professor Brent points out. He goes on to say that similarly in the future it might hypothetically be possible for terrorist organisations to break today’s unbreakable codes, like credit card encryption. Yet even though mathematics is vital to the way we live today, we both agree that as a focus, maths would make for a less than appealing James Bond film.