

Editorial

Welcome to *Mathematics Today*. I am your new Editor and Chair of the Editorial Board. I would first like to thank Dave Percy for all his hard work since he became editor in February 2015. You will find an appreciation by the Editorial Board of what he has achieved on page 50 of this issue. Since I joined the IMA over 20 years ago, Dave was only the fourth person to chair the Editorial Board, and he will indeed be a hard act for me to follow. In the past there have been occasional guest editors, and it is the intention that this will continue in the future. I find it a somewhat daunting task ahead of me, but I am assisted by the very capable hands of the IMA Editorial Officer, Rebecca Waters, and the members of the Editorial Board.

As this is my first editorial as the new Editorial Board Chair, a bit about me is perhaps appropriate. I graduated as an electrical engineer more than 50 years ago and spent all my working life in industry. My main interest was researching signal processing and its application to communications and navigation systems. Along the way, one of my managers amusingly described me as ‘an engineer who can do sums’ and put me in charge of a group of graduate mathematicians, so I signed up with the Open University and studied mathematics. I was a visiting industrial professor for nearly 20 years, and gave lectures on signal processing at master’s level. I have been a member of university industrial advisory boards, and most recently was an independent expert for the University Defence Research Collaboration Phase 2: ‘Signal Processing in a Networked Battlespace’. I am familiar with many aspects of what the IMA does – I was a member of the Council for 13 years, including four as VP for Professional Affairs, and for the last 10 years I have been a member of the Professional Affairs Committee. I hope my experience will stand me in good stead for this my latest challenge as the Editor of *Mathematics Today*. That’s now quite enough about me.

Some excellent news for mathematics in early February was the result of the *Icons* series on BBC2 in which the public were asked to vote on who they considered to be ‘the greatest person of the 20th century’. Programmes were dedicated to leaders, explorers, scientists, activists, entertainers, sports stars, and artists and writers. In the final programme it transpired that the ‘father of the computer and World War Two code breaker’ Alan Turing was voted the overall winner. As I’m sure many readers know, Alan Turing was a mathematician whose work at Bletchley Park is claimed by some historians to have shortened the war by two to four years. Good news indeed that the public voted for a mathematician to be the winner.



Alan Turing finishing a race in 1946



Edward on the Lartigue Monorail, Listowel

I am always amazed by the number of articles appearing in newspapers that require serious mathematics, and I often wonder how many readers realise that without mathematics many of the reported ground-breaking and life-changing developments simply wouldn’t happen. My observation is that some topics tend to dominate more than others.

The current hot topic seems to be artificial intelligence (AI), which was chosen by the IMA President Designate, Nira Chamberlain, for his ‘Diary of a New Scientist Live Speaker’ (as reported on page 226 of *Mathematics Today*, December 2018). AI is finding its way into many different applications, and promises to be of tremendous benefit in medicine and the treatment of disease. It is also having a significant technological impact on the worlds of both work and leisure, and many universities offer undergraduate courses which include AI.

There have been many articles in the *Daily* and *Sunday Telegraphs* since the beginning of 2019 concerned with applications of AI. Examples include: Google suggesting that it may not be the ‘cure all’ for new drug discovery (13 Jan); people who do not use social media may have their personal data at risk from friends who do (22 Jan); what AI means for the future of work (27 Jan); machines that are starting to think for themselves (31 Jan); Google AI better than humans at spotting eye disease (6 Feb); competition between mainstream sex robot manufacturers¹ (13 Feb); and Amazon and Google going head to head in the chips race (14 Feb). The list seems to go on, with at least one a week concerned with AI.

Other topics that often appear in the press involving serious mathematics include machine recognition (automatic recognition of speech, text, faces, finger prints, retinas ...), autonomous systems (driverless cars, robots ...), and virtual reality (flight simulators, headsets for computer games ...).

As many readers know, cryptography requires serious mathematics and is a topic which gains much publicity when hacking and information security breaches reach the headlines. Artificial intelligence, machine recognition and autonomous systems have their part to play as ‘front end’ information processes, but the level of security achievable depends on the strength of the cryptographic codes. According to some pundits quantum computing (QC) now poses a serious threat, since the promised ultra-high speeds could break the codes used in today’s cryptographic processes far more quickly. A number of big technology companies

are known to be researching QC, as exemplified by this headline in the *Daily Telegraph*: ‘IBM banking on being first to crack the quantum code’ (12/11/2018).

A couple of headlines in November 2018 provided me with wry amusement: ‘Automated system wrongly blames top business woman’ (26/11/2018) and ‘Chinese police accuse billboard on side of bus of jaywalking’ (27/11/2018).

These two articles concerned an advertisement on the side of a bus with a life-size picture of a well-known local business woman. The bus had passed by a camera programmed to identify jay walking, and incorrectly decided that the real person was jay walking! This shows that automated technology can sometimes provide wrong answers, and when this is part of a safety critical system we must of course ensure that adequate safeguards are in place.

Talking of China, a headline in my local paper, the *Reading Chronicle* on Thursday 10 January 2019 warmed my heart. It read ‘Mathematics date in China’ and concerned two teachers representing local schools who had been on an exchange visit to experience Shanghai’s ‘world renowned teaching practice’. China’s strength in the teaching of mathematics has been in the news before, and previously mentioned in *Mathematics Today*, but I hadn’t appreciated just how beneficial the Shanghai teaching method has become. It’s good to know that those teaching the next generation here in the UK are prepared to explore best practice in other countries, and long may it continue.

In this issue of *Mathematics Today* we have the usual variety of articles covering a range of different mathematical topics. Apart from the latest news, letters and other regular contributions (Urban Maths, Westward Ho! etc), we have feature articles concerned with user-friendly logarithms, the next number in a particular sequence, distinct polygons with corners equally spaced around a circle, and Asymmetric Cassini Ovals. Sadly,

in this issue there is also an obituary for Sir Michael Atiyah OM FRS FRSE Hon FIMA who died on 11 January 2019. He was a president of the Royal Society and a mathematician who provided theoretical tools for particle physics (see page 44). I also note that on the 1 January 2019 the *Daily Telegraph* had an obituary for the number theory expert Professor Sir Peter Swinnerton-Dyer who died on 26 December 2018.

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I will end this my second editorial on a lighter note. My first one was as a guest editor in October 2008 when I wrote about volunteering. I have always been fascinated by certain proofs in mathematics that are not difficult to follow but none-the-less intrigue me.

These include proof by induction, proof that the square root of 2 is irrational, and proof of why the ratio of successive terms in a Fibonacci series converges to the Golden Ratio, no matter what seeds are used as long as they are both positive. After reading the December 2018 issue of *Mathematics Today*, I have now added Pick’s Theorem (ima.org.uk/10981/connecting-the-dots-with-picks-theorem) to my list of mathematical items that intrigue me. I hadn’t come across it before, but unfortunately a simple proof does not seem to exist. Is this perhaps another challenge?

Future issues of the editorial will aim to highlight the many and varied activities that the IMA undertakes on behalf of you, the members. A quick scan of past issues of *Mathematics Today* soon reveals just how many there are, and what they achieve for the benefit of mathematicians and mathematics in general.

I hope you enjoy reading this issue and find it both interesting and stimulating.

Edward Stansfield CMath CSci FIMA

Notes

- 1 I hesitated before deciding to include this!

Increasing use of biometric data and its problems often appear in the newspapers

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