Editorial

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This special issue of MSOR Connections is based on contributions to a workshop, 'Programming in the undergraduate mathematics curriculum', which took place at Middlesex University on 27th June 2019, and other submissions received on the same theme.

The Bond Review (*The Era of Mathematics: An Independent Review of Knowledge Exchange in the Mathematical Sciences*, 2018) recommended that "all mathematics students should acquire a working knowledge of at least one programming language." In response to this, when the Institute of Mathematics and its Applications issued a call for proposals for its *Higher Education Teaching and Learning Series* workshops in 2019 this included a suggested theme "Developing undergraduate programming and coding skills in the mathematical sciences". Matt Jones (Middlesex University) and Peter Rowlett (Sheffield Hallam University) submitted a proposal on this theme, which was funded by the IMA and Middlesex University and resulted in the workshop. We therefore gratefully acknowledge the role of the Bond Review and the Institute of Mathematics and its Applications in the origins of this special issue.

The first three papers report talks presented at the workshop; the remaining papers were received following an open call for submissions on the theme.

The issue opens with an article from Lynch detailing the change in the landscape of mathematics degrees and the impact of that on curriculum design around programming.

Rowlett's article follows with a discussion of the art of programming as it relates to mathematical thinking and, in particular, the difference between coding and programming in the context of a second-year module. Next, Jones and Megeney continue the theme of developing higher programming skills with a case study detailing a group assessment on a second-year module where students are introduced to design patterns and version control allowing for a more significant piece of software.

Gwynllyw, Henderson, Van Ient, and Guillot follow, presenting a case study also detailing how assessment can be designed to enable students to produce a more significant piece of software, this time in a third-year numerical analysis module.

Lee and Button follow with an update on the changes to the Further Mathematics A-level curriculum, in particular the Further Pure with Technology unit that introduces programming.

Three papers complete the issue presenting various automated assessment methods. Both Bostelmann and Morley detail the use of unit testing to assess student work, one in Java and the other in Python. Graham presents an article on assessing programming using the Numbas system.

Finally, to round off the issue, Elwes and Sturman present a set of barriers and how they were overcome in embedding computational mathematics in an undergraduate programme.

We write this in the middle of the worldwide Covid-19 pandemic. Over the last few months thousands have contracted and died of this virus including members of our community. Entire countries have been placed under various degrees of lockdown. And, as governments slowly ease restrictions, we face an uncertain future both in terms of our collective physical and mental health, and in terms of the economic impact.

In this context, we are especially grateful to the authors and anonymous reviewers of articles for this issue, who have worked in a relatively timely manner despite global circumstances.

We are grateful, too, for the work of Tony Mann and Alun Owen on editing this issue, particularly around the careful handling of articles from Rowlett and Jones and Megeney.

During the pandemic lockdown, there have been a number of online events related to university mathematics teaching, learning, assessment and support. We would like to draw your attention to session recordings and resources from:

- Teaching And Learning Mathematics Online (TALMO) [IMA, LMS and RSS] http://talmo.uk/
- **sigma** Online Support Workshop [**sigma** Network] http://www.sigma-network.ac.uk/sigma-online-support-workshop-29th-may-2020/
- E-Assessment in Mathematical Sciences (EAMS) [Newcastle University] https://eams.ncl.ac.uk/

Over the course of 2019, the editors and editorial board of MSOR Connections have completed a piece of work looking at the membership and makeup of the editorial board. This is the first issue published since the announcement of the enlarged and much more international editorial board, so we would take this opportunity to welcome Shazia Ahmed, Noel-Ann Bradshaw, Cosette Crisan, Anthony Cronin, Francis Duah, Jonathan Gillard, Michael Liebendörfer, Birgit Loch, Ciarán Mac an Bhaird, Eabhnat Ni Fhloinn, Josef Rebenda and Frode Rønning to the editorial board.

You can contribute to the work of *MSOR Connections* in providing a forum for sharing and discussion of ideas around teaching, learning, assessment and support by writing case studies about your practice, accounts of your research and discussing your opinions, and by acting as a peer reviewer for articles.

To submit an article or register as a reviewer, just go to https://journals.gre.ac.uk/index.php/msor. When you register as a reviewer, it is very helpful if you write something in the 'reviewing interests' box, so that when we are selecting reviewers for a paper we can know what sorts of articles you feel comfortable reviewing.

We hope you enjoy reading this issue.