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School of Education

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Centre for Research in Mathematics Education

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Welcome

In this issue we are proud to report that Hugh Burkhardt and Malcolm Swan are the recipients of the prestigious Emma Castelnuovo Award for Excellence in the Practice of Mathematics Education. You can read more about this immediately below. You can also find out about our current visiting professor, Steve Rhine, and two of our first-year PhD students from Brazil. We also have details of a new funded project, "Networked Improvement Community", some of the Centre's recent academic publications and information about upcoming CRME seminars.

If you have suggestions of items for inclusion in future newsletters, please email me. I would be delighted to hear from you.

Colin Foster colin.foster@nottingham.ac.uk

Editor

An Award for Hugh Burkhardt and Malcolm Swan

Last year, the International Commission on Mathematical Instruction, the world body in our field, established a new prize: The Emma Castelnuovo Award for Excellence in the Practice of Mathematics Education. Hugh and Malcolm were selected as the first winners. The citation includes the following:

Burkhardt and Swan have served as strategic and creative leaders of the Nottingham team of researcher-designers. Together, they have produced groundbreaking contributions that have had a remarkable influence on the practice of mathematics education ... Burkhardt and Swan's approach is distinguished by their efforts to address the problem of improving learning strategically and across all levels of education by:

• Designing lessons that promote deep learner engagement in those activities;

• Designing professional development to help teachers use the lessons;

• Designing system change (e.g., in assessment, curriculum, and teacher support) to promote the above; and

• Encouraging educational researchers to value more highly ... impact ... on the educational system.

The nature and quality of the work has appealed to many funding agencies, so that funding has been continuous and has grown, building to a current team of about ten people in Nottingham and many more through collaborative projects. For example, a project that has received considerable attention is the Mathematics Assessment Project, a collaboration between the Nottingham team and the University of California, Berkeley. Its 100 Classroom Challenges, which are formative assessment lessons based on diagnostic teaching, have received over 3 million lesson downloads. Through the MAP and other projects, Burkhardt and Swan continue to have an extensive impact on mathematics teaching and assessment around the world.

The MAP website is http://map.mathshell.org.uk/materials/index.php

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Project Focus: Networked Improvement Community

The Mathematics Assessment Project team (see http://map.mathshell.org.uk/materials/index.php and above) is moving on to a new project: developing a "Networked Improvement Community to Support Common Core State Standards Implementation" – MathNIC for short. The project was created in recognition that many of the barriers to improving mathematics education in the classroom are at system level. (This is as true in the UK as in the US.) The goal is to see how far the creative

design and systematic development methods for which the Nottingham team is famous around the world can enable systems to overcome these barriers. The work is again supported by the Bill & Melinda Gates Foundation.

The MAP team will work with 10 US school systems to design and develop robust and effective ways of tackling some of the core problems that implementing these new standards presents. These approaches need to reconcile the different pressures and priorities of people at every level in the system – from the classroom teacher to the superintendent. These levels will be represented in each of the "partner" teams, which will work with MAP at the first MathNIC workshop in San Francisco this month.

Key challenges will be identified by the school district partner teams. Together we will select some of those that can best use the design and development expertise of the Nottingham team. Design ideas will come from partners' experience, and from MAP. The Nottingham team will provide the engineering: detailed design of processes and tools, and their systematic improvement through trialing and revision. So this project is ground-breaking, taking us some way out of our comfort zone, but it is work that needs to be done and we have a lot to build on from MAP and our earlier projects. We'll see what emerges!

Hugh Burkhardt

Visiting Professor: Steve Rhine

My name is Dr. Steve Rhine. I have been a Professor of Education at Willamette University in Salem, Oregon, in the United States, for the past 19 years, working in teacher education. Recently, I was Principal Investigator for a four-year US Department of Education funded Fund for the Improvement of Postsecondary Education grant for a consortium of universities in the northwest United States that established and developed the resources for the Center for Algebraic Thinking (algebraicthinking.org). Our consortium read research that has been done on students' algebraic thinking for the past 30 years (about 850 articles) and created resources based on what might be valuable from that research for pre-service teachers. Resources include an encyclopedia of algebraic thinking, formative assessment database, video database, and 20 iPad apps. My research interests are in students' mathematical thinking and the role technology can play in learning. Currently I am working with Marc North on web-based applications for struggling students in algebra and with Diane Dalby on the FASMED project, observing students in schools using technology and CRME tasks. I am interested in other potential collaborations with staff at CRME.

Steve Rhine

PhD Focus: Two students from Brazil

I am a PhD student and my supervisors are Dr. Peter Gates and Dr. Colin Foster. My research is about professional development of mathematics teachers working with disadvantaged pupils. Before coming to the University of Nottingham, I was living in Brazil and teaching mathematics in secondary schools and also working in programmes for professional development. In previous years, I had experience with the development of educational resources and online courses for continuing professional development that, although they are not part of my current studies, will always be in my interest list.
Rita Santos Guimaraes

Before coming to Nottingham, I had a long experience developing digital educational resources (www.m3.mat.br) and continuing professional development courses in Brazil and was teaching mathematics and computer programming for Secondary Schools. My original (and generic) research interest was "task design for low-achieving students" but, as the time (and studies) goes on, it is being better delineated around the use of mathematical tasks designed to enhance visual ability with students in lower sets.
Leo Barichello

CRME Publications

Members of CRME regularly publish articles and papers about their work and on mathematics education more generally. A few that might be of interest are listed below. More information about the team's publications can be found at www.nottingham.ac.uk/education/research/crme/index.aspx

Evans, S. & Swan, M. (2014). Developing students' strategies for problem solving. *Educational Designer, 2*(7): www.educationaldesigner.org/ed/volume2/issue7/article25/

Foster, C. (2014). Minimal interventions in the teaching of mathematics. *European Journal of Science and Mathematics Education, 2*(3), 147–154. http://scimath.net/articles/23/231.pdf

Gates, P. (2014). Equity and access in mathematics education. *Encyclopedia of Mathematics Education*, 217–221. http://link.springer.com/referenceworkentry/10.1007/978-94-007-4978-8_58

Hodgen, J., McAlinden, M. & Tomei, A. (2014). *Mathematical transitions: a report on the mathematical and statistical needs of students undertaking undergraduate studies in various disciplines.* Higher Education Academy

(HEA).
www.heacademy.ac.uk/sites/default/files/resources/HEA_Mathematical-transitions_webv2.pdf

Swan, M. & Burkhardt, H. (2014). Lesson design for formative assessment. *Educational Designer, 2*(7):
www.educationaldesigner.org/ed/volume2/issue7/article24/

Wake, G. & Newton, L. (2014). Connecting science with mathematics: thinking outside the toolbox. *School Science Review, 95*(352), 81–87.
www.ase.org.uk/journals/school-science-review/2014/03/352/

If you are unable to access any of these articles, please contact the authors.

CRME seminar programme

We have three CRME seminars coming up:

- 4.30 pm Thursday 7 May 2015
  Professional learning in the context of Bowland professional development: Mrs Oublier revisited?
  Dr Steve Watson, University of Cambridge
- 4.30 pm Wednesday 27 May 2015
  Technological revolution in American schools and the Center for Algebraic Thinking
  Professor Steve Rhine, Willamette University, Salem, Oregon, USA.
- 4.30 pm Wednesday 17 June 2015
  Changing attitudes and images of mathematics in post-16 vocational education
  Dr Diane Dalby, University of Nottingham

We would love to see as many people as possible at these. Normally we have dinner afterwards with the speaker, and everyone is very welcome to come along. If you are not receiving notifications of these events, and would like to be, please get in touch with Anne Floyde Anne.Floyde@nottingham.ac.uk.

Colin Foster

If you have any comments regarding this newsletter, or would like to be added to or removed from our mailing list, please contact Anne.Floyde@nottingham.ac.uk. Previous newsletters can be found at http://www.nottingham.ac.uk/education/research/crme/news-and-events/index.aspx. The editor is Colin Foster.