**Spring**

12

Lynne McClure

Pink for all to look at please

Yellow for Libby

Blue Yi

Green Steve

NRICH interim report April 2012

08

**Fall**

**NRICH Interim Report**

# April 2012

### The NRICH team

Lynne McClure Project Director

Jenni Back (PT) Primary Coordinator (Maternity cover)

Jennie Pennant (PT) Primary Coordinator (Maternity cover)

Bernard Bagnall (PT) Primary Teacher Associate

Charlie Gilderdale Secondary Coordinator

Alison Kiddle Secondary Teacher Associate

Steve Hewson (PT) Post 16 Coordinator

Jenny Gage (PT) KS3/4 STEM Coordinator

Emma McCaughan (PT) AskNRICH Teacher Associate

Rob Percival (PT) Stimulus Coordinator

**Technical support:**

Mike Pearson

Owen Smith

Chris Clarke (PT)

Technical staff are employed by the MMP and have duties across all the projects.

**Consultants:**

Sue Gifford Early Years

Penny Coltman Early Years

Jenny Murray Primary

Leo Rogers History of Mathematics

Vicky Neale Undergraduate mathematics

### Introduction

This interim report brings NRICH activity up to date since the previous annual report in Autumn 2012. Only significant changes are described.

**People**

Liz Woodham left us to go on maternity leave in October 2011, and we were delighted that baby Amy arrived safely in November. Liz’s work has been admirably covered by Dr Jenni Back, a previous primary coordinator for NRICH, and Jennie Pennant who was previously the CPD coordinator for the very successful BEAM project. Jenni has taken main responsibility for the primary parts of the site whilst Jennie has coordinated the increasing CPD offer. The rest of the team remains the same.

### Our Funders

We are now into the last year of the substantial grant from the John Templeton Foundation which funds the majority of the work of the team. As of April 2012 we have no other significant funding to replace this.

The Clothworkers stemNRICH grant continues for another year to enable us to deliver professional development in STEM at KS3 and KS4.

Steve Hewson and Alison Kiddle have been funded by \*\* to deliver the Easter STEP school on behalf of the Mathematics Faculty.

The Maths and Sport project is partly funded by the Nuffield Foundation, and the Ernest Cook Trust has provided partial finding for new Early Years activities.

The team continues to bring in money from CPD projects such as the Heymath project in India, Other income is derived from conference keynotes, CPD events with teachers, HEIF 4 grants, and royalties from previously published books.

**The Website**

### Monthly themes in the academic year 2011-12 to date have largely reflected the interests of our guest editors. Professor Malcolm Swan, (using children’s solutions to develop deep thinking), Tim Rowland (proof), James Grime and Simon Singh (codes and ciphers, linked with the Turing anniversary) and Professor John Barrow (maths and sport) have all worked with us and this initiative continues to be a great source of professional development for the team.

**Key Stage 5**

We have updated our core mapping documents at <http://nrich.maths.org/curriculum>, incorporating an easy labeling system to help distinguish between individual tasks, tasks for classroom consolidation or introduction of new curriculum content.

The cycle of 52 weekly challenges is now complete <http://nrich.maths.org/6497>

We are building a set of Stage 5 investigations <http://nrich.maths.org/7401>

**Stages 3 & 4:**

We have regularly updated our Stage 3 & 4 Curriculum Mapping document: <http://nrich.maths.org/curriculum>

The "rich tasks" linked to the different areas of the curriculum have been chosen because they are ideal for developing subject content knowledge as well as mathematical thinking.

The NRICH Starter Problem Selection has also been updated, listing NRICH tasks according to key mathematical processes: <http://nrich.maths.org/6365>

We have developed a package for Secondary CPD <http://nrich.maths.org/7767> focusing on three key areas:

Starting with a Rich Challenge

Consolidating with Rich Tasks

Building a Community of Mathematicians

We have developed two packages suitable for half-day masterclasses:

From the Particular to the General: <http://nrich.maths.org/7927>

Working with Numbers: <https://nrich.maths.org/8284>

**Key Stages 1 & 2**

Our March website featured the tricky concept of generic proof where one example reveals the underlying mathematical structure that demonstrates the validity of the claim. In the article ‘Take One Example’ (<http://nrich.maths.org/8081>) describing it we have some video clips of two girls working on a generic proof that sum of three consecutive numbers is divisible by three.

**EYFS**

With the funding from the Ernest Cook Trust Fund together with a HEIF 4 grant we are continuing to develop some new approaches to activities for use with children in Early Years Foundation Stage settings. Some of our initial pilot trails have been live on the website for a while but we are developing them further so that they really offer young children opportunities to develop the building blocks for mathematical thinking and reasoning. These approaches link closely with the rich tasks and low-threshold high-ceiling approaches that NRICH prides itself on. We are working closely with early years specialists in this project.

**And across all ages:**

We have lots more annotated video of members of the team working with students of different ages and in working with partner schools in this way we have deepened our relationships with them.

We've updated our posters archive and added some new posters to download, print, and display in classrooms: <http://nrich.maths.org/posters>

**Restructuring and redesigning the site**

**Exceptionally Able Mathematicians**

We continue to add to the suite of activities which offer opportunities both for students to work independently, and, through the accompanying teacher notes and support, for teachers to use them as suitable activities to offer their most able students.

**stemNRICH**

Our secondary STEM page (<http://nrich.maths.org/7266>) has resources for maths and science and now for maths and DT as well.  During the next few months, we will be adding teacher notes and video clips to help teachers develop their STEM practice.  There are also resources designed with STEM clubs in mind - these are suitable for top primary groups as well as secondary groups.  Our latest feature is the STEM picture of the month.  We have held two very successful STEM ‘Teacher Inspiration’ days in this academic year where pairs of teachers (maths, and science or DT) from secondary schools come together to share both STEM content and strategies for embedding STEM activities within the timetable.

**Maths and Sport**

Together with other members of the MMP, we continue contributing to the new Nuffield-funded Maths and Sport site, <http://sport.maths.org> timed to be complete for the 2012 Olympics. The activities and articles are published on both the Maths and Sport and NRICH sites, and extend across the whole age range from 5 to post-16.

**Mobile NRICH**

Mike continues to keep his ear very close to the ground about all things technical and in particular about new mobile technology. The lack of a sensible useable alternative to Flash on Apple is proving a challenge but we are making progress!

**Metrics**

**Site visits**

**Professional Development Activities**

Since September we have worked with \*\* teachers, \*\* of them here at CMS and the remainder at various venues around the country.

**STEM Teacher Inspiration Days**

**NQT TI day**

We have planned our second NQT Teacher Inspiration day in July, based on lythe highly successful day we held last year. <http://nrich.maths.org/7486>

**Hampshire**

Lynne has worked with nearly every primary head teacher and maths manager in Hampshire at joint CPD days held all over the county.

**Maths and Creativity Project in Bristol.**

Jenni has continues to support this ongoing project funded by Creative Partnerships and includes a research aspect with UWE

**NRICH abroad**

We have hosted study visits from colleagues from Germany, Denmark and France. Charlie worked with schools in Pakistan and Lynne has worked in Scotland. Whilst we know our sessions are welcomed and our resources meet with great enthusiasm, such visits also increase our own understanding by giving us a different perspective on our work.

**Any significant others that ought to be here?**

**Working with students**

**Any significant others that ought to be here?**

**Other professional development events and conferences**

In addition to these projects, the team have spoken at numerous conferences, either as keynote speakers or as workshop leaders. Other national associations we have worked with in this capacity since September include: NCETM, MA, ATM, NANAMIC, NAMA, AMET, STEMNET, JMC, and the RI.

**Research**

**Templeton**

**Strand 1** of the Tracking Initiative, led by Dr Wai Yi Feng involves an accelerated longitudinal study of exceptionally gifted students.

Since the last report, good progress has been made in Phase 2 of the research in Strand 1 (Data Collection & Analysis):

* The second round of interviews is close to completion. Seven of the nine exceptionally mathematically-able young people being tracked by the project have been interviewed for a second time.
* Transcription of interviews is being undertaken in parallel with data collection. Half of the interviews from the second round have already been completely transcribed.
* Coding and analysis of interviews from the first and second round are continuing apace. The emerging life stories, including the exceptionally mathematically-gifted research participants’ experience of mathematics and use of NRICH resources will be tracked in forthcoming interviews.

The third round of interviews is expected to take place in December 2011/January 2012.

**Strand 2** involves a “tracking back” study analysing the mathematical learning experiences of an identified group of highly gifted students, led by Dr Stephen Hewson, NRICH.

As detailed in the previous report, an initial pilot survey questionnaire gathered data from 750 current University of Cambridge students from a broad cross-section of mathematics and science subjects and year-groups, including 23% of first-year mathematicians and 25% of first-year engineers. The survey was designed to gain a snapshot of the mathematical education factors leading to success in university science, engineering and mathematics courses for exceptionally gifted students, along with the associated perceptions of mathematics and mathematics interventions held by such students. The survey incorporated questions covering many aspects of students’ experiences and views of mathematics and mathematics education from primary school level through to the mathematics involved in their university courses. The responses from this questionnaire have now been analysed and a detailed report on interim findings from the first phase of the “tracking back” study is available.

**Strand 3** of the tracking initiative involves analysis of the usage of the AskNRICH discussion boards, and is led by Mrs Libby Jared. There are four foci, A.B.C,D.

A.There has continued to be significant activity in this focus since the previous report with substantial work undertaken on categorising posts and tracking AskNRICH users. All posts were allocated to a category: Asking for Help (2 codes), Helping (4 codes) and General (5 codes). At the time of writing this part of the report, final analysis of these is on-going. From findings to date we infer that the data shows that AskNRICH is not only a place where people ask for help and give help; there is also other activity such as giving and receiving feedback, clarifying one’s own and each others’ statements, and simply commenting.

B It was intended to carry out detailed analyses of individuals posts. However this has proved impractical not least because of the randomness of posters posting. Instead the work has focused o capturing opinions of posters at various stages of their engagement with ASkNRICH.

C Individual interviews have been undertaken with two posters who began their involvement with NRICH before the age of 16, and who have become AskNRICH team members, both completing their undergraduate degrees in June 2011. The interviews will be transcribed and analysed.

A full report of the whole tracking research project will be available at the end of 2012.

All three strands are supported by research assistant Carol Sparke

**Other research grants**

A HEIF 5 **(Knowledge Exchange Project)** grant of £16,000 was awarded to us as a contribution towards the development of Early Years activities. This, combined with the previously mentioned Ernest Cook grant, has enabled Jenni Back to lead the project in collaboration with early years specialits and practicing early years teachers in partnership schools.

The problem solving project lead by Dr Vicky Neale supporting HE colleagues in embedding problem solving into their courses is coming to the end of its duration and the last stage is to devise a parallel site for the materials, linked with NRICH . is leading the Cambridge part of this work.

Steve and Alison continue in their Masters level courses and offer us lunch time seminars when appropriate.

**CMS and Education**

Our relationships within CMS continue to strengthen as evidenced by the major Easter STEP school fro 80 students, delivered by Steve and Alison for the Mathematics Faculty.

Different team members contribute to primary and secondary PGCE courses in Maths and Science. We attend STEM academic meetings and Maths colloquia whenever possible. We support the Cambridge Primary Network by providing maths CPD to partner schools.

**Wider representation**

**Other related activities**

NRICH was invited to become a full member of JMC and we are now represented by a team member at each JMC meeting. Jenni, Steve and Lynne hold posts of responsibility in different subject associations and Lynne’s term on ACME has been extended for an additional eight months.

Charlie has contributed to the Prince’s Teaching Institute residential school, Jennie and Lynne have contributed to MaST programmes at various HEIs.

### Stimulus

Stimulus continues to thrive and this year we have placed \*\* Cambridge students into \*\* schools so far. A new project, based at CMS and working with Dr Marjorie Batchelor, is to place part 3 maths students into sixth forms for an extended period of time to work with lower sixth maths A level pupils. There is a double aim in this; to give the students an opportunity to experience A level teaching and to share some of their own personal mathematics with younger pupils.

### AskNRICH

### Emma McCaughan continues to direct this flourishing social networking site. However it is now looking very tired so we are intending to revamp it in line with the new main NRICH site.

### Publications

##### Can you please add your publications since September here.

McClure in McAteer M (ed) (in press) Highly Able Children chapter in *Improving Primary Mathematics; Teaching and learning* OUP

### Marketing and Publicity

**Facebook and Twitter**

Alison continues to do a very effective job in keeping us in the public eye through social networking opportunities. The NRICH Facebook page <http://www.facebook.com/nrichmaths> has a current total of \*\*\* subscribers and the NRICH Twitter feed <http://twitter.com/#!/nrichmaths> currently has \*\*\* followers.

### We also continue to publicise ourselves though the very popular postcards and posters, and have now secured a presence on the CMS electronic screens to publicise visits and events that we hold.

### Into the future

The structure and design of the new site is occupying most of our time and energy, and we are aiming to have some significant changes ready for the September launch. Our next Awayday will be an important one as we plan for the next period in the development of the NRICH project.

Lynne McClure

NRICH Project Director

April 2012