

# Research in the School of Mathematics

**Nick Higham**

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# Manchester Institute for Mathematical Sciences

**Director:** Nick Higham

**Deputy Director:** Mike Prest

**MIMS Committee** : + 8 others

- MIMS  $\equiv$  mathematics research in Manchester.
- A focus for **internationally excellent research** in mathematics.
- Magnet for virtuoso researchers.
- Encourages and supports core mathematical *and* interdisciplinary research.
- Dedicated physical space in AMPS building.

# MIMS: School Colloquia

- Sir Michael Berry (Physics, Bristol)
- Prof Elmer Rees (Maths, Edinburgh)
- Prof Fan Chung Graham (Maths/CS, San Diego)
- *Invited for autumn 2005:*  
Prof Lai-Sang Young (Courant Inst., NYU)



# MIMS: Workshops 2005–To Date

- July 4–5. **Workshop on Finite Elements and Fast Iterative Solvers**
- June 7. *Workshop: Differential Operators on Graphs*
- March 22. *Workshop on N-body problems*
- March 21-24. **53rd European Study Group with Industry**
- March 18–19. **Where will the next generation of mathematicians come from?**
- Feb. 24. *Workshop on Polynomial Eigenvalue Problems*
- Feb. 18. *One Day Ergodic Theory Meeting*
- Jan. 10–14. **4th International Symposium on Levy Processes: Theory and Applications**
- Jan. 9–14. *LMS/EPSRC Short Course on Mathematical Biology*



You missed a bit: Anne and her tan at The Ivy

Picture: REX FEATURES

# Tan Robinson (Apart from her feet!)

SHE beamed a sunny smile to complement her new tan. But if Anne Robinson had glanced down, she may have felt more than a little browned off.

For in her quest for that summery all-over bronzed look, her feet proved the weakest link ... being a whiter shade of pale. There was speculation that the 60-

year-old BBC quiz show hostess had misapplied a spray-on tan. However, she seemed blissfully unaware of the glaring omission as she enjoyed an evening out at The Ivy restaurant in Covent Garden.

'It was really funny,' said one onlooker. 'Anne was wearing a lime green dress that set off her golden tan. But when she

entered the restaurant, which is very dimly lit, her little white feet and ankles seemed to be glowing in comparison.

'Perhaps she applied a spray-on tan when she was wearing socks, or just found it awkward to reach down so low. Either way, her snow-white feet slightly spoiled an otherwise fantastic look.'

## The A-grade maths students leaving school innumerate

By **Laura Clark**  
Education Reporter

THE best and brightest maths students are leaving school innumerate because of the way the subject is taught, leading mathematicians warned yesterday.

Reducing maths to unrelated, bite-sized pieces means even straight-A students can be 'unteachable' by the time they reach university, says a report.

To compound the problem, our primary and postgraduate maths degrees are held in such poor regard that British universities prefer to recruit post-graduates from abroad.

And with modern society dependent on mathematics, the country is having to rely on 'imported intellect' across a swathe of professions.

The critical shortage of specialist teachers needs to be tackled, and 'mathematically-challenged teachers need to be re-educated'.

The damning findings emerged from a seminar organised by Dr Tony Gardiner of Birmingham University and Professor Alexandre

**MATHS**, physics, chemistry, biology and engineering are university disciplines that belong to the 19th century, funding chief Sir Howard Newby declared yesterday.

More than a third of chemistry departments have been shut in a decade.

But Sir Howard, head of the Higher Education Funding Council, said there was no need for 'moral panic'.

It was inevitable that pure sciences would be super-

ceded by degrees such as media studies and design and engineering, he said. Sir Howard was unveiling plans to support degree subjects seen as vital to the national interest but struggling to attract students. A spokesman for the Royal Society of Chemistry said: 'If chemistry is a 19th century subject, how come chemical science businesses produce £5 billion worth of exports every year?'

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In an era where power and wealth increasingly derive from "intellectual property", the UK is in danger of becoming totally dependent on imported intellect.

The UK no longer produces sufficient competent mathematicians to supply the bulk of its core needs.

The experts said the problem stemmed from 'soft' maths teaching in schools and universities, which does not challenge students.

The exam system made it 'impossible to teach and to assess mathematics in an integrated way', making the sub-

ject 'arguably less appetising than ever'.

In the past, students might integrate several equations to get a final answer. But today they are spoon-fed tasks, learning how to do equations but not when or why they would be used.

In addition, maths is plummeting in popularity, with A-level entries falling from 85,000 in 1989 to 54,000 in 2002.

The number of specialist maths teachers fell from 46,500 in 1988 to 30,800 in 1996, and the failure to tackle this shortage was 'breathtaking'.

Dr Gardiner said: 'Reports from all over the country indicate clearly that those emerging from our schools with top grades in mathematics are increasingly innumerate and even ineducable.'

He said maths had been reduced to bite-sized chunks, concluding: 'What we are giving them is pap.'

'As soon as they are given something chewy, they can't take it.'

A spokesman for the Department for Education said: 'No Government has done more to get the basics right in schools. Standards in maths are rising.'

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# MIMS: Distinguished Visitors

- **Professor Roy Mathias** (College of William and Mary, Williamsburg), April 2004–Dec. 2004
- **Professor S. G. Dani** (Tata Institute of Fundamental Research, Mumbai), Oct. 2004–Nov. 2004
- Professor V. N. Remeslennikov (Omsk University, Russia), June 2005–Aug. 2005
- Professor Nalini Joshi (Sydney University), Dec. 2005–Jan. 2006
- Professor Albert Shiryaev (Moscow State University), Jan. 2006–Feb. 2006

**EPSRC Visiting Fellowship**

# MIMS: Funding Summary

- 21 “projects” funded.
- £47k committed, incl. for underwriting.
- £107k external support obtained or pending.

# MIMS: Preprint Server

- Repository of work by people in, or associated with, the School.
- Aim: **publicize and make freely and widely available mathematics research in Manchester.**
- Reprints, preprints, theses, tech. reps, books.
- Can eventually serve as our “RAE database”.

# MIMS: Preprint Server (cont.)

- School Preprint Group active since Nov. 2004.
- Consistent with aims of
  - JISC Open Access
  - U of M Institutional Repository bids (Robin Joinson)
  - U of M e-Research Management System Project (David Whitehurst)
- MBS: similar ambitions for preprint service.
- Based on EPrints software (OAI-PMH:A compliant).

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MIMS



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- Eprints.org
- Eprints software

## The MIMS Eprint Server

Welcome to the prototype MIMS preprint server, a very lightly modified version of the default configuration supplied with [GNU EPrints archive software](#).

[More information](#) is available about the archive.

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This server uses *GNU EPrints*, a suite of archive-creating software that generates eprint archives that are compliant with the [Open Archives Protocol for Metadata Harvesting OAI 1.1 and 2.0](#). This means that your eprints can be indexed automatically by, for example, [CiteSeer](#) and [Google Scholar](#).

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Broomhead, D.S. and Huke, J.P. and Muldoon, M.R. and Stark, J.

[Iterated Function System Models of Digital Channels](#)

13 July 2004, Article. [Deposited 23 June 2005]



Higham, Nicholas J.

[The scaling and squaring method for the matrix exponential revisited](#)

2005, Article. [Deposited 24 June 2005]

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# Industrial Links: Inverse Problems Group

- Led by **Dr Bill Lionheart**.
- Close links with other Schools and Faculties, e.g., joint EPSRC grant w/School of Materials, collaboration on process tomography with E&EE and CEAS. Growing links with ISBE and Medicine.
- Industrial links: collaborative EPSRC funded projects with Corus Group, Hewlett Packard Labs, PhD student at Philips Labs, consultancy with Schlumberger. Member of *Virtual Centre for Industrial Process Tomography*: “industry club” including chemical, pharm. and instrument companies. Links with SMEs.
- Medical links include collaboration with medical physicists in hospitals in UK and abroad on inverse problems.
- Real-life industrial problems incorporated into MSc modelling course, including problems in collab. with industrial partners.

# Two Major Bids in Progress

- **EPSRC Multidisciplinary Critical Mass Research Activity in Mathematics** £1M call. One of four institutions invited to submit full bid: **The Dynamics of Hybrid and Adaptive Computational Systems** (Maths–CS). [Bid to *EPSRC Taught Courses in Complexity Science and Complex Systems*  $\approx$  £60k]
- **Science and Innovation Award** Outline bid, £3M, submitted: **Centre for Computational Imaging**. Involves 3 faculties: EPS, Medical & Human Sciences, Life Sciences.