SMSTC Research Skills Day

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Today's programme

- 10.00 - 10.30: Unexpected connections: Tom Leinster
- 10.30 - 11.00: Finding information: Fraser Daly
- 11.00 - 11.30: Data in research: George Streftaris
- 11.30 - 12.00: Break (refreshments available)
- 12.00 - 12.45: Writing mathematics: Richard Scott
- 12.45 - 13.30: Lunch (provided)
- 13.30 - 14.15: Talking about research on social and broadcast media: Oliver Johnson
- 14.15 - 15.00: Public engagement and outreach: Francesca Iezzi
- 15.00 - 15.30: Break (refreshments available)
- 15.30 - 16.15: Giving a mathematical talk: Rachel Norman
- 16.15 - 16.30: Round-up and goodbye: Fraser Daly

Today's programme

Two themes for today:

- Becoming a professional mathematician, and
- Communicating mathematics

Academia is not the prize

A typical maths department might have roughly as many PhD students as academic staff.

- Typical PhD study: 3–4 years.
- Typical academic career: 30–40 years.

Most PhD holders will not become academics.

Fortunately, most maths doesn't happen in universities. Most professional maths doesn't even happen in universities.

Becoming a professional mathematician

A PhD is seen as a passport to the professional mathematical community.

- What does this actually mean?
- Are we really professionals?
- What forms might ‘being a mathematician’ take?

What is a professional mathematician?

Something like a lawyer / medic / engineer?

- specialised **knowledge** (not available to general public);
- formalised career structure and **certification**;
- **autonomy** and self-regulation.

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Something like a professional artist or musician?

- **income** depends (partly) on doing it;
- special **skills** but not always formalised;
- every amateur thinks they could do it better.

Things to consider

- How do you define ‘your’ research interests?
- How does mathematics relate to a wider public?
- Where do you want to take yourself and your ‘research’ skills after your PhD?
- What do you want ‘being a professional mathematician’ to mean for you?

Why do we communicate research?

Some (overlapping) reasons:

- to **share** ideas (with research communities or with the public);
- to **record** the results of our research for the long term;
- to claim **credit** or **priority** for our work;
- to gain **credibility** for ourselves and our ideas;
- to look busy. ☹

Different reasons or different audiences need different approaches!

Some forms of written communication

- **Peer-reviewed journal papers** (the "gold standard"?).
- **Conference papers** and abstracts.
- **Books**: academic or popular.
- **Preprints**.
- **Theses** and **technical reports**.
- Scientific **software** (subscription or non-subscription).
- **Patents**.
- **Websites** and **social media**.
- Newspapers, magazines and **press releases**.

Is mathematics really a written tradition?

In practice, most of us don't learn research by reading it.

The written tradition depends on an oral tradition:

- one-on-one meetings (coffee breaks, research visits...)
- informal group meetings (seminars, chalk-talks...)
- formal talks (conferences, visiting speakers...)

Without this, a subfield quickly withers.

Recommended reading: W. P. Thurston, *On proof and progress in mathematics* (1994).

Things to consider

- How can you find existing information and data, and synthesize it into your own work?
- What does it mean to communicate mathematics effectively, and how can you do this?
- How might your style of communication change depending on your audience? Or on the medium through which you are communicating?