November 2020

The *I'm a Mathematician* Line Zone ran from 2 to 27 November 2020.

The Zone featured 32 mathematicians, offering flexibility to teachers in how, and when, they can take part. This is in response to the COVID-19 situation causing greater restrictions and uncertainty in schools.

The Line Zone was supported by the Institute of Mathematics and its Applications.

Mathematicians

- 32 mathematicians created profiles in the Zone.
- 24 engaged with students through live Chats and/or Ask questions.
- Mathematicians from a broad range of fields and career stages took part. For example:
  - Kate Elliott - Medical Physicist working for the NHS
  - Christos Klerides - modeller for Mott MacDonald
  - Sarah Barry - medical researcher at the University of Strathclyde

Students

- 243 students from 7 schools in England and Scotland logged into the Zone.
- 36% of active students were from target schools (WP and/or U).
  - 32% were from widening participation (WP) schools.
  - 4% were from underserved (U) schools.

Live Chats and Questions

- 17 live Chats took place took place during the activity.
- 25 live Chats were booked (from 30 available slots), but dropout was higher than usual with 6 cancellations and 2 'school no shows'.
- On average, 5 mathematicians attended each live Chat session.
- 5 teachers typed questions in a live Chat on behalf of their students, so the number of students engaged may be higher by up to 125.
- 35 student questions were approved. Mathematicians responded with 121 answers.

Key figures	
Schools	7
Students logged in	243
% of students active	80%
Questions asked	44
Questions approved	35
Mathematicians onboarded	32
% of Mathematicians active	75%
Mathematician answers	121
Mathematician comments	18
Student comments	4
Student votes	162
Live chats	17
Lines of live chat	5841
Average lines per chat	344

Impact of the COVID-19 pandemic

Uptake across all November 2020 Zones was much lower than initially expected.

The COVID-19 pandemic increased uncertainty and pressure in schools. Many teachers reported lost time due to school closures and students isolating, and a need to focus on the core curriculum.

Student attendance dropped to 65% for some schools in November. The rapidly changing situation made it difficult for teachers to plan ahead. Many schools restricted access to shared IT equipment, leading some teachers to ask questions in live Chats on behalf of their students, projecting the Chat on a screen. The average class size attending a chat was 25% below normal.

School Activity

School	Active students	Chats attended/ booked	Live chat lines		Questions approved
			Total	Per student	
The Holt School, Wokingham	123	5/5	1825	15	24
St Bridget's Primary School, Glasgow City (WP)	49	2/2	717	15	1
Gillibrand Primary School, Chorley (WP)	13	1/1	390	30	0
Stanborough School, Welwyn Garden City (U)	8	1/1	176	22	9
Cobham Free School, Cobham	1	0/1	0	0	1
Ark St Alban's Academy, Birmingham* (WP)	0	4/7	111	111	0
Compton CE Primary School, Berkshire*	0	1/1	39	39	0

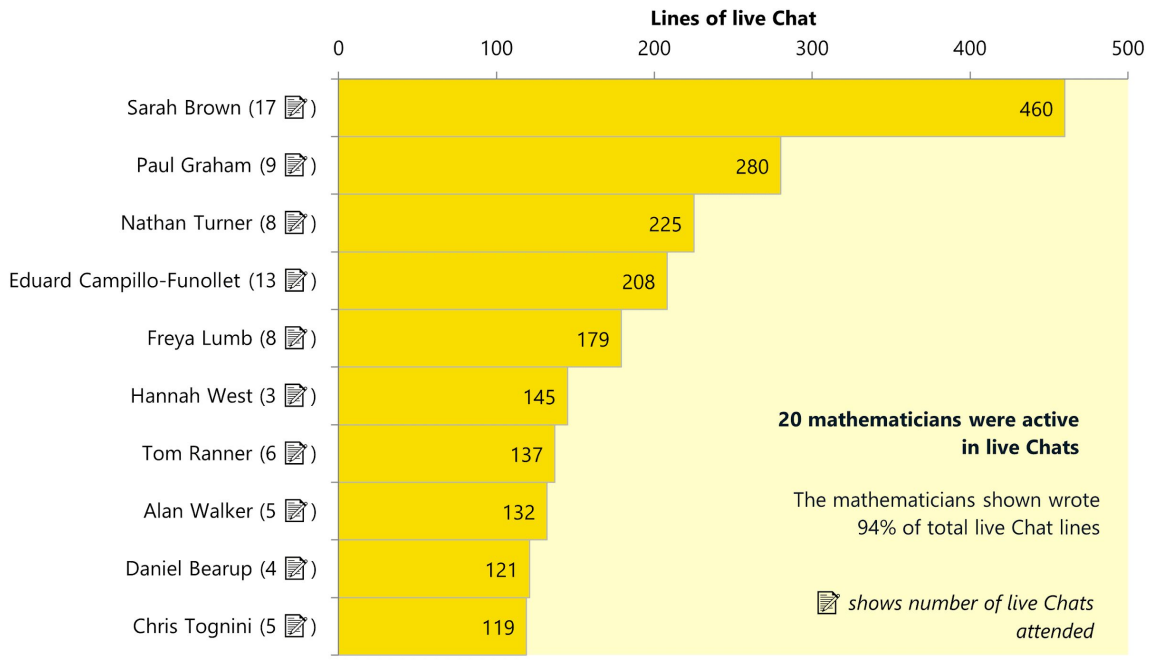
*These schools took part through the teacher account due to restricted access to individual student laptops.

We want to increase the participation of under-represented groups going into STEM careers. Find out what we mean by our under-served (U) and WP schools (WP), and how you can support us in working with more of these at: about.imascientist.org.uk/under-served-and-wp

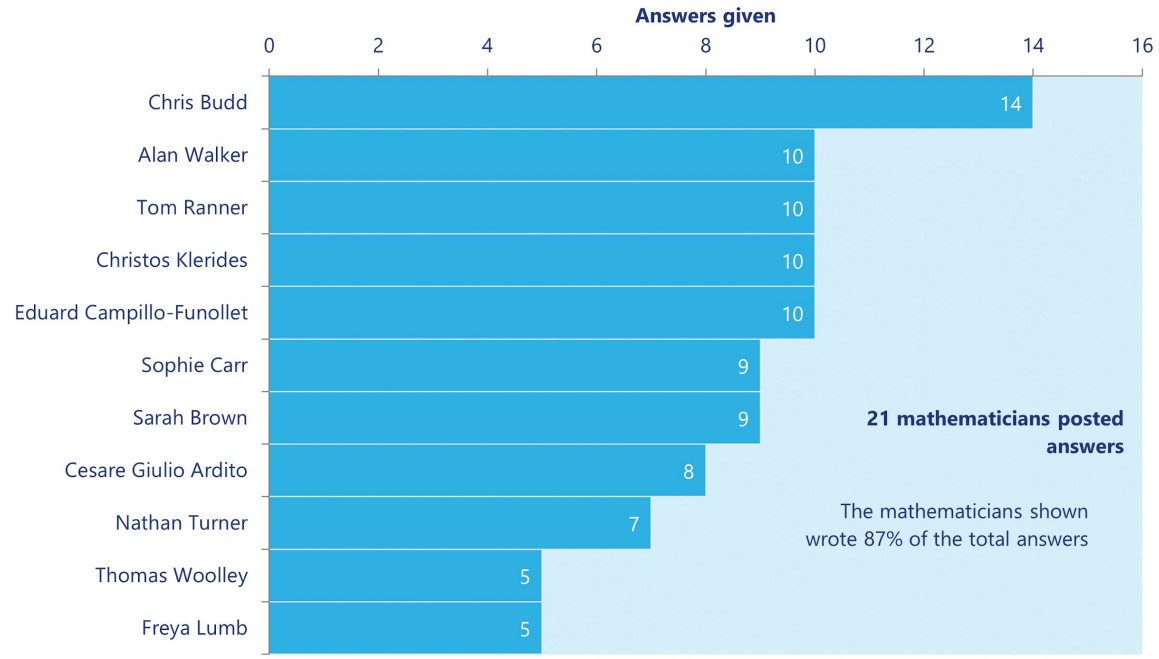
Mathematician activity

24 mathematicians were active in the Zone, writing 2583 lines of live Chat, and providing 121 answers to posted questions.

10 most active mathematicians in live Chats

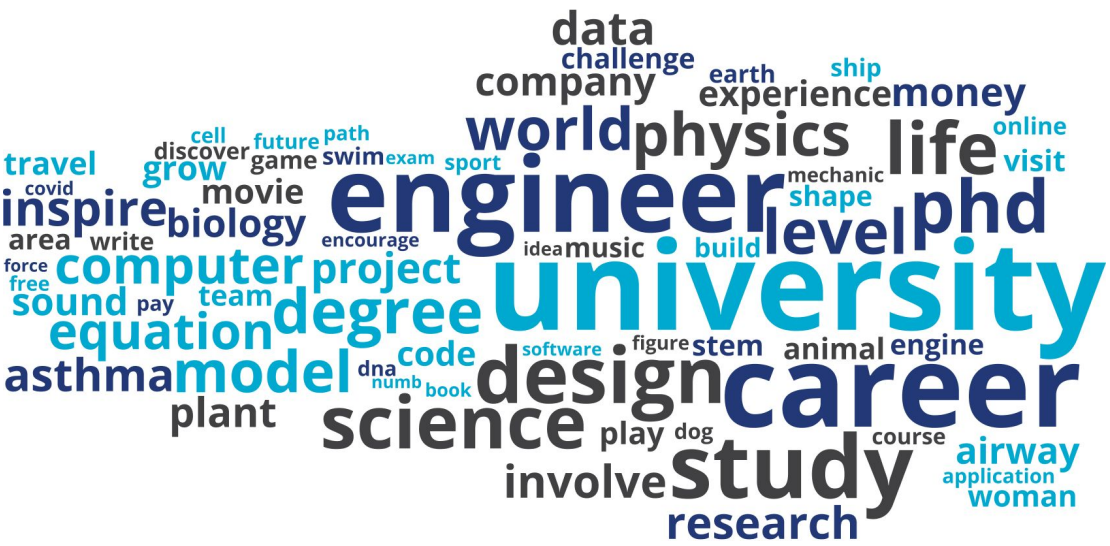


10 most active mathematicians in posting answers



See all the participating mathematicians: line20.imamathematician.uk/mathematicians

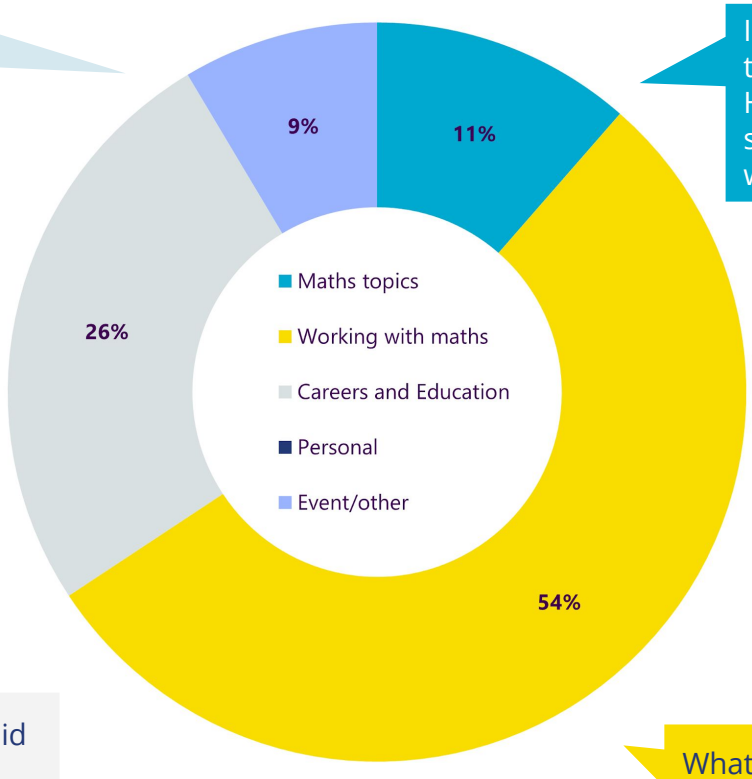
Frequent words used in live Chats by students and mathematicians



Question themes and examples

Why do you think you are most deserving for the money?

In your opinion will the Riemann Hypothesis ever be solved and if so, when will it be?



What sort of subjects did you have to take in A-Levels and GCSEs?

In what way can I use maths to work out strategic advantages and disadvantages in a board game like chess?

What qualifications did you need to get into your job?

What type of tools do you use to teach people to analyse data?

Examples of good engagement

Students had some very in depth conversations with the mathematicians about careers, and the necessity for maths and statistics during the live chats. The students often asked about their own career interests, and the mathematicians offered insight into areas of research the students may be interested in.

Matthew D @FreyaAddison: I love astronomy - Which maths goes into that? I am considering it as a possible career

> **Christos** @Matthew D I did a project in astrostatistics at the end of my first year at university so I would say statistics is relevant
>
> **Freya** @Matthew D: Great career. Well it depends on what aspect of space you are interested in. For solar physics you might do something called fluid dynamics, for astronomy you will do a lot of trigonometry, for building equipment you will be looking at geometry and measurements. For recording data you might dip your toes into coding. For black holes, and space travel there are complex equations like time dilation. Almost any area of maths there will be some aspect that you will use in one of the astronomy branches. Derivations were definitely a key part of my course.

Matthew D @FreyaAddison: Thanks! I recently saw a video about the speed of light - very interesting - it was talking about how no-one had actually measured how fast light is

> **Hannah** @Matthew D: Particularly apt around bonfire night, being able to notice the time lapse between seeing and hearing fireworks

Matthew D @hannahspeed: I was trying to measure it yesterday - I got it down to approx. 680 metres

> **Hannah** @Matthew D: Wow! Cool!
>
> **Freya** @Matthew D: Yes, its interesting isn't it. When we measure something, we need to have a frame of reference. STFC (science & technology facilities council), part of their job is to calibrate instruments and define units of measurements. But there is certainly ways we can estimate it, and some can do it well enough that it has an accepted definition.

Matthew D @FreyaAddison: I think that it was about we had only ever measured the 2 way speed

Students also discussed activities involving maths that they took part in outside of school, building a great rapport with the mathematicians:

Matthew D @Nathan: Me and my friends are currently participating in a thing called the Cipher Challenge - have any of you heard of that?

Sophie @Matthew D: I have - my son has done it in previous years

Matthew D @Sophie: Yes, the first actual challenge went live at 15:00

Sophie @Matthew D: Are you enjoying it?

Sophie @Matthew D: That's great to hear, it's really good fun. My son and the rest of his team are all dyslexic so think differently - they were often top of the their school's leaderboard!

Matthew D @Sophie: My team and I are going to solve Cipher 1 tomorrow after school

Sophie @Matthew D: Fantastic! That's a great after school club

Matthew D @Sophie: It is, aptly named, Maths Club

Sophie @Matthew D: Ha ha!!

Mathematicians of the week

Students voted each week for their favourite mathematician to be named *Mathematician of the Week*. On weeks 2 and 4, two mathematicians tied.

These mathematicians were: **Hannah West**, **Sophie Carr**, **Hannah Speed**, **Sarah Brown**, **Nathan Turner**, and **Freya Addison**.

The overall winner of the Zone was **Sarah Brown.**

Feedback

"It has really expanded my views on maths!!"

Student

"Thank you everyone. This has been greatly awesome and I have enjoyed it greatly."

Student

"The *I'm a Mathematician* platform presents a great opportunity for both students and mathematicians. I have gained lots of practice in articulating what I do, have been challenged to think more broadly about maths."

Sarah Brown, Line Zone winner

"Thank you so much for answering the children's questions. They have been really inspired."

Teacher