Space Zone November 2020

The Space Zone ran from 2 to 27 November 2020 as part of *I'm an Engineer*.

The activity ran for longer than previous *I'm an Engineer* Zones (4 weeks instead of 2). It also featured more engineers (20 instead of 6). This was to offer greater flexibility to teachers in how, and when, they can take part in *I'm an Engineer*. This was in response to the COVID-19 situation and greater restrictions and uncertainty in schools.

The Space Zone was funded by the UK Space Agency, and the Science and Technology Facilities Council (STFC).

Engineers

- 20 engineers created profiles in the Zone.
- 19 engaged with students through live Chats and/or Ask questions.
- Engineers from a broad range of fields and career stages took part. For example:
  - Abbie Hutty - works on the Exo-Mars Rosalind Franklin Rover for Airbus Defence and Space Ltd.
  - Steve Williams - a Flight Software Engineer at Surrey Satellite Technologies.
  - Harriet Gamble - a Space Systems Engineer at Airbus.

Students

- 579 students from 20 schools all over the UK logged into the Zone.
- Turnout was 72% of the 800 target.
- 63% of active students were from target schools (WP and/or U).
  - 45% were from widening participation (WP) schools.
  - 26% were from underserved (U) schools.

Live Chats and Questions

- 38 live Chats took place took place during the activity.
- 56 live Chats were booked (93% of capacity), but dropout was higher than usual, with 14 cancellations and 4 'school no shows'.
- On average, 4 engineers 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.
- 82 student questions were approved. Engineers responded with 182 answers.

Key figures	
Schools	20
Students logged in	579
% of students active	82%
Engineers onboarded	20
% of engineers active	95%
Questions asked	195
Questions approved	82
Answers given	182
Scientist comments	41
Students comments	4
Votes	327
Live chats	38
Lines of live chat	11874
Average lines per chat	312

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

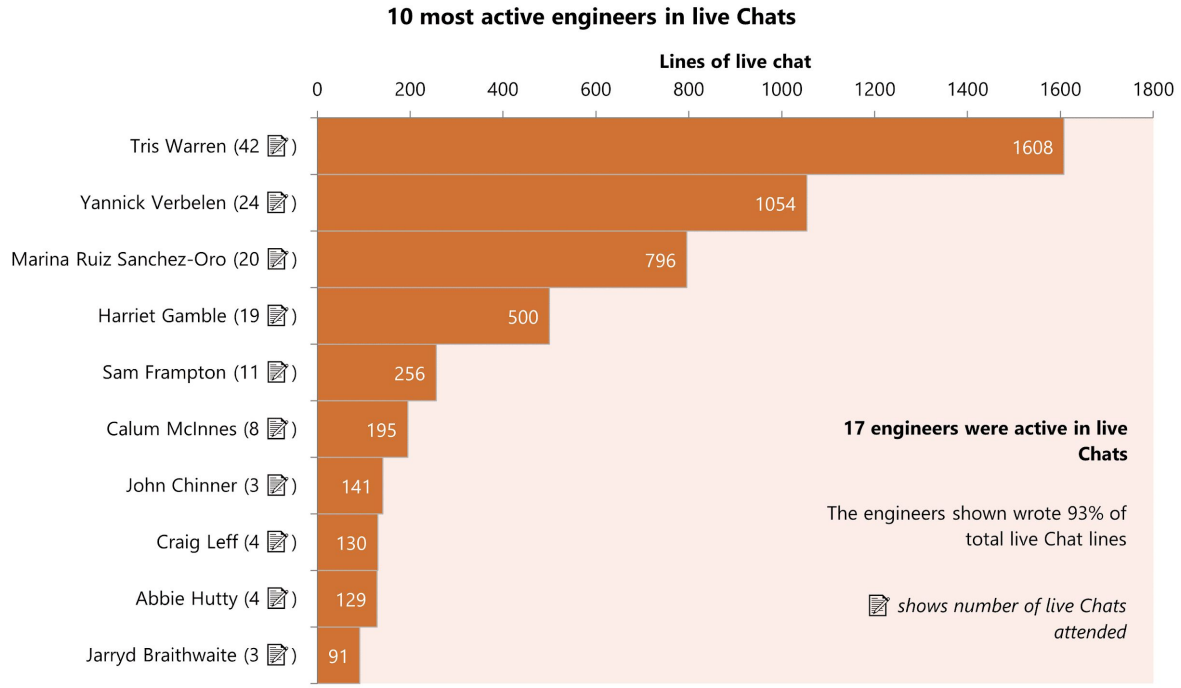
School	Active students	Chats attended /booked	Live chat lines		Questions approved
			Total	Per student	
Harris Academy Rainham, Rainham	81	3/9	862	11	35
The Heathland School, Hounslow (WP)	63	3/3	1010	16	5
St Bridget's Primary School, Glasgow City (WP)	52	2/2	797	15	2
Gorsemoor Primary School, Cannock	49	1/1	742	15	0
Trinity CofE High School, Manchester (WP)	34	2/2	574	17	6
Bexley Grammar School, Welling	29	1/2	526	18	2
Arunside Primary School, Horsham (U)	27	1/2	271	10	0
Somervale School, Radstock (U)	21	3/3	383	18	2
Colton Hills Community School, Wolverhampton (WP/U)	20	1/1	205	10	0
Mallaig High School, Highland (U)	20	1/1	145	7	0
The Petchey Academy, London (WP)	17	1/1	173	10	15
Saint John Houghton Catholic Academy, Ilkeston	16	1/1	278	17	4
Melior Community Academy, Scunthorpe* (WP/U)	14	6/6	257	18	0
Weston College, Weston-Super-Mare (U)	10	1/1	81	8	0
Litherland High School, Liverpool (WP)	9	1/1	66	7	0
Millais School, Horsham (U)	5	1/1	121	24	1
Orchards Academy, Swanley (WP/U)	4	0/2	0	0	9
Wallace High School, Stirling (WP)	2	Only joined open chats	48	24	1

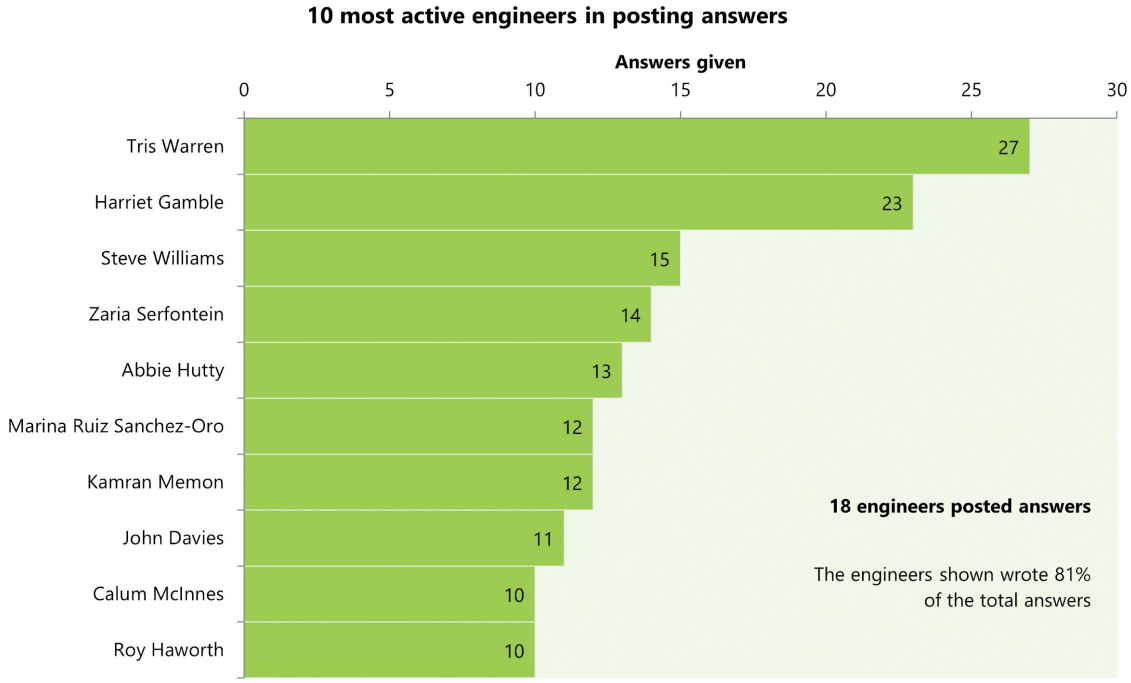
*This school also took part through the teacher account due to restricted access to individual student laptops.

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/**

Engineer activity

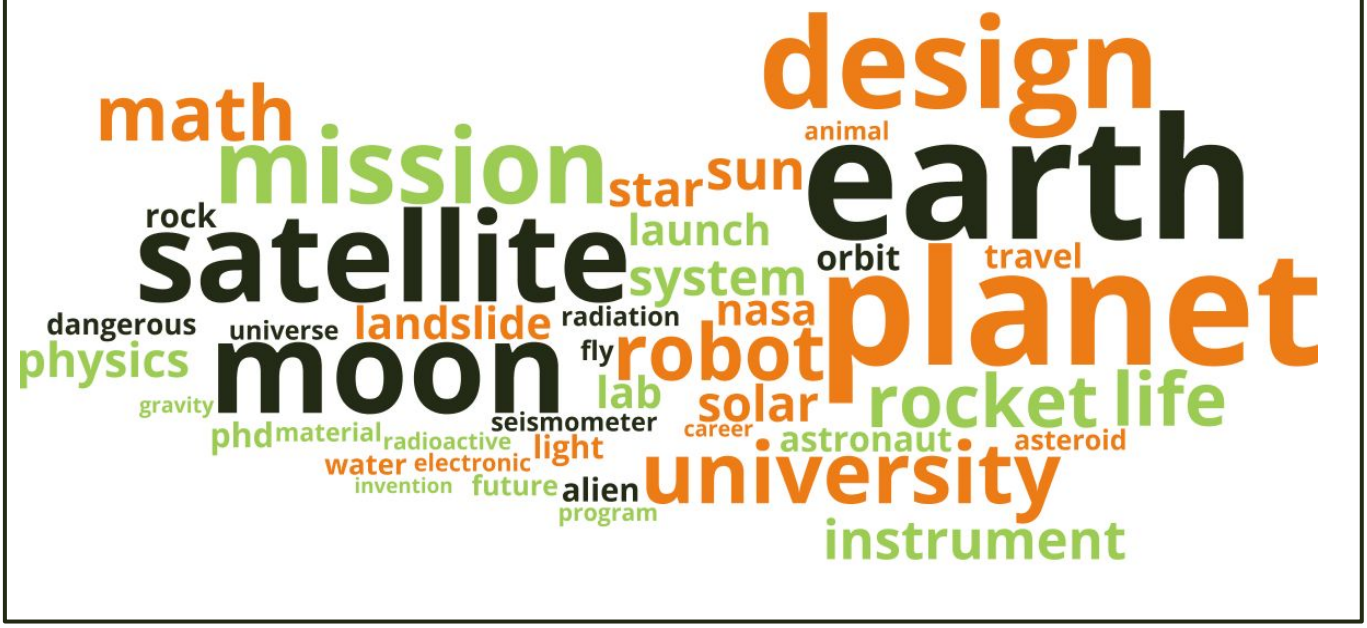
19 engineers were active in the Zone, writing 5,267 lines of live Chat, and providing answers to 182 posted questions.



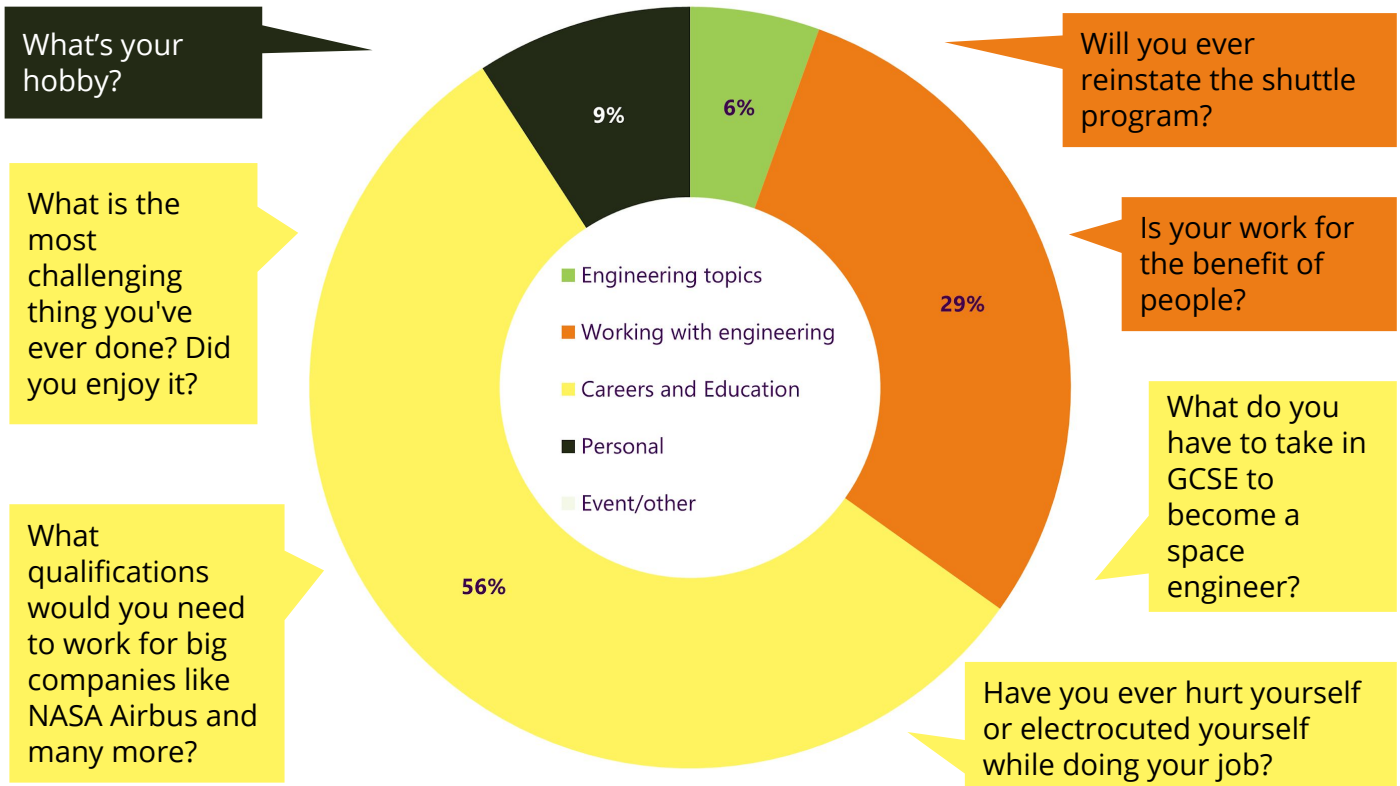


See all the participating engineers: space20.imanengineer.org.uk/engineers

Frequent words used in live Chats by students and engineers



Question themes and examples



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Engagement examples

Students asked the engineers about a variety of topics during live Chats, including some very well researched and thoughtful questions about the specifics of their job, demonstrating students had read their profiles. The engineers were great at explaining complicated topics in ways which students could understand:

dreg132reg @Harriet: so what is the typical lifespan of the satellites you send into orbit?

> **Harriet** @dreg132reg: There are some really short lifespan satellites but the ones I work on generally stay in orbit for 5-15 years

dreg132reg @Harriet: oh and what type of orbit are they put into? a polar, a equator orbit, or a elliptical orbit? and how high up are they?

> **Harriet** @dreg132reg: A lot of the ones I work on are in low earth orbit at 500-850 km altitude. We then choose if it is sun sync, polar or elliptical depending on where on Earth we want to image and how often.

dreg132reg @Harriet: ah okay, and what type of rocket do you tend to use to put them up into orbit? and how large are they?

> **Harriet** @dreg132reg: One of the satellites I am working on at the moment is literally the size of a large van so need a large rocket for that like Soyouz. For smaller satellites there are smaller options like the Indian PSLV or you can ride share with other satellites

dreg132reg @Harriet: oh so you don't use rockets like the ariane 5?

> **Harriet** @dreg132reg: We could, that would suita really big satellite. We also have to look at where each rocket launches from and what orbit we want to get into.

Students were also encouraged by the engineers to think and consider the answers to their own questions, such as in this discussion between Tris and a student. This helps students to feel that their opinions are valued, contributing to their Science Capital:

Halan @all are there any asteroids stopping at planet earth or even any planets?

> **Tris** @Halan: We have lots of asteroid hit the Earth all the time. There are all very small and alot burn up in the atmosphere, but some hit the Earth.. Do you know where the best place to find them is?

Halan @Tris: The ocean takes up pretty much of earth's surface area so I think the ocean?

> **Tris** @Halan: Thats very good thinking... but would it be easy to search the ocean? Where would be the best place to find a rock that has fallen from space? Where would it stand out?

Halan @Tris: the desert

> **Tris** @Halan: bingo! And the arctic! In fact the UK often sends exploration teams to the antarctic to search for asteroids.

Halan @Tris: kind of forgot about the acrtic 😬

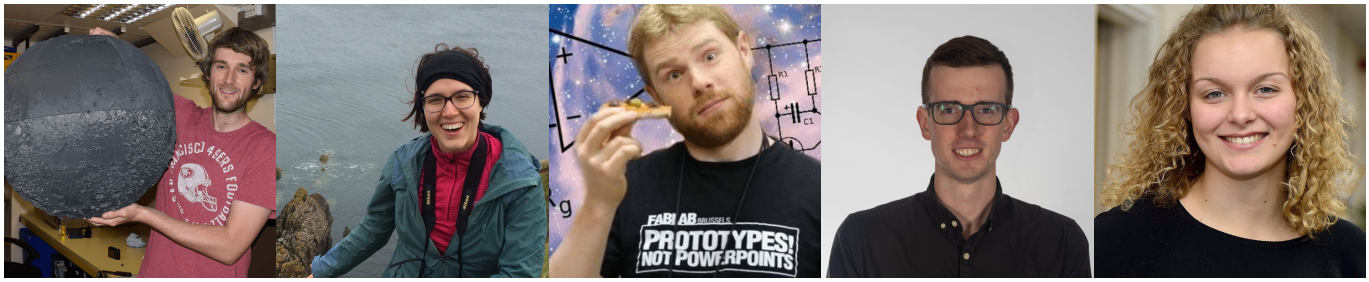
> **Tris** @Halan: But astreoids fall all over the world... its just easy to spot them in places like the arctic and deserts :)

Engineers of the Week

Students voted each week for their favourite engineer to be named *Engineer of the Week*. There was a tie in week 4. The *Engineers of the Week* were:

Tris Warren, **Marina Ruiz Sanchez-Oro, Yannick Verbelen**, **Calum McInnes**, and **Harriet Gamble**.

The overall winner in the Zone was **Yannick Verbelen.**



Feedback

"My class have found this really interesting and exciting!"

Teacher

"Space IS AmAzIng @all ill miss this chat all of you are great engineers :("

Student

"Showing up and answering these questions is a brilliant insight for us - it's a really valuable experience for our students to widen their horizons and see the benefit of speaking to new people. It also brushes up on their communication skills!"

Teacher

"I have lots of children in class now asking lots of fantastic questions which has made a really good start to our Space unit."

Teacher

St.Bridget's Primary @StBri... Nov 5
Fantastic P7 chats with @imascientist and @IAEGMOOH. Both classes asking incredible questions and receiving amazing answers in the Yellow Zone, Health Zone and Space Zone. @DYWGlasgow #futurescientists #futureengineers

"The enthusiasm of students proves that the *I'm an Engineer* initiative is a fruitful recipe to keep students engaged with science and technology through novel channels. Especially at times when regular classes are suspended to keep the virus in check, the Chat sessions have been a welcome change in routine for both the students, and the engineers and scientists participating."

Yannick, Space Zone Winner