

I'm a Scientist & I'm an Engineer

Ireland November 2014

Evaluation Report



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Intro

I'm a Scientist and *I'm an Engineer* follow the same format. *I'm a Scientist* is a free X Factor-style competition for scientists, where students are the judges. Scientists and students talk online. They break down barriers, have fun and learn.

Scientists create online profiles:

beryn14.imascientist.ie/profile/shikhasharma/
& energy14.imanengineer.ie/profile/lauratobin/.

School students get to ASK questions and challenge the scientists over intense, fast-paced online live CHATS. They VOTE for their favourite to win a prize of €500 to communicate their work with the public.

The events are split into zones of 5 scientists and around 330 students each. *I'm a Scientist* zones are either themed (eg Evolution, Sustainability) or general (named after elements, with a broad mix of 5 scientists). *I'm an Engineer* zones are themed around engineering areas such as Energy or Transport rather than engineering disciplines, which just reinforce the divide between different types of engineer (eg Electrical, Civil, Mechanical), and the general ones are named after units of the International System.

I'm a Scientist and *I'm an Engineer* are global events; also running in the UK, Australia, Malaysia & Kenya.

Our **key findings** in 2014 are:

- Students are inspired to learn more about science and get interested in science related jobs
- Students understand what engineers do and what engineering is all about
- Scientists and engineers consider they have improved their communication skills
- Scientists and engineers get enthused about public engagement and want to do more of it after taking part



1. SFI Grant objectives

Thanks to SFI funding, we successfully ran 4 *I'm a Scientist* and 2 *I'm an Engineer* zones. Two of the *I'm a Scientist* zones were themed (Evolution and Sustainability) and two of them were general (Boron and Beryllium). One of the *I'm an Engineer* zones was themed (Energy) and the other one was general (Kelvin). The event ran for two weeks at a time (10th-21st November 2014)

We wanted to raise additional funding, and so we created two FundIt.ie campaigns to raise the money to fund a Food Zone and a Pharmaceutical Zone – aiming at two of the main industrial sectors in Ireland. Our strategy didn't work, and we've written some reflections here: about.imascientist.ie/2014/10/24/crowdfunding-confusion/

Below we have summarised our key objectives and their results.

Objective	Result
Run 7 zones in total: 35 scientists & 2,310 students from 60 schools engaging with each other	We have only run 6 zones , with a total of 30 experts. However, we reached a total of 2,274 registered students from 60 schools in the two events. The average number of registered students in an <i>I'm a Scientist</i> zone was 413, greatly exceeding our objective of 330 students. Fewer students registered in <i>I'm an Engineer</i> , mostly due to the Kelvin Zone getting only 116 registered students.
An additional 15,000 people viewing imascientist.ie and 5,000 viewing imanengineer.ie	During the 2 weeks of the event, plus the 2 weeks surrounding it (previous and following), there were over 123,300 page views from more than 17,400 visitors to <i>I'm a Scientist</i> and almost 32,000 page views from more than 1,900 visitors to <i>I'm an Engineer</i> . We have exceeded our target number of 15,000 visitors for <i>I'm a Scientist</i> , but we are still behind for <i>I'm an Engineer</i> , which target was 5,000. We should note that the number of page views and visitors to <i>I'm a Scientist</i> has been increasing every year since the event started. This suggests that it takes time to spread the word among the educational community, and we expect the same effect will be seen in <i>I'm an Engineer</i> in the following years.
Students see the wide range of cutting edge science and engineering happening across Ireland	<p>We always try to have a balance of scientists and engineers from a range of career stages and institutions. Many of the scientists taking part in previous <i>I'm a Scientist</i> events in Ireland, were based at Trinity College Dublin. This year we focused on getting scientists from different institutions across Ireland involved in the event. Only 4 out of the 20 scientists taking part in the event worked at Trinity College Dublin. The rest of them were spread between different universities and organisations across The Republic of Ireland and Northern Ireland. A couple of scientists were based in institutions in the UK or Europe.</p> <p>As for the career stage, most of the scientists taking part were PhD students – as they are the ones with the more flexible schedule and also, those who often benefit more from taking part, by improving their communication skills at an early stage in their careers. However, postdoctoral researchers as well as lecturers, a scientist from industry and one working in a planetarium also took part in this year's <i>I'm a Scientist</i> event.</p> <p>Engineers were also well distributed across organisations: half of them were working in academia. Of these, one was at Trinity College Dublin, two at University College Dublin, one at University College Cork and the last one in Queen's University Belfast. The rest worked in industry or government in Ireland, except for one engineer who was working in a private company in the United States.</p> <p>We got almost a perfect gender balance in both <i>I'm a Scientist</i> and <i>I'm an Engineer</i>, with nine women (out of 20 participants) taking part in <i>I'm a Scientist</i> and five women (out of 10 participants) in <i>I'm an Engineer</i>. What is more, 50% of winners in each event were female.</p> <p>See tables depicting these figures in the next section.</p>

2. Key figures

Being online gives us the opportunity to gather a massive amount of data about the event. The table below summarises some of the data collected for *I'm a Scientist* and *I'm an Engineer* in Ireland in November 2014, compared to the event that was run in November 2013. Figures from *I'm an Engineer* are in the green (to the right), and figures from *I'm a Scientist* are in blue (to the left).

	IAS 2013		IAS 2014		IAE 2014	
	2013 zones average	2013 event total	2014 zones average	2014 event total	2014 zones average	2014 event total
Number of scientists	5	20	5	20	5	10
Number of registered students	312	1,247	413	1,651	208	415
Number of schools	11	23	12	49	6	11
% of active students (ASK, CHAT, VOTE or comment)	78%	-	87%	-	87%	-
Number of questions asked	471	1,883	842	3,336	494	988
Number of questions approved	239	956	352	1,407	227	453
% of questions approved	51%	-	42%	-	46%	-
Number of answers given	492	1,969	556	2,224	609	1,218
Total number of comments	84	337	83	333	40	79
Number of votes	198	792	360	1,438	181	361
Number of live chats	11	42	20	81	13	26
Number of lines of live chats	3,823	15,293	4,683	18,732	2,588	5,176

As we can see, the **number of registered students has increased dramatically** in *I'm a Scientist* as has the number of schools taking part in the event. What is more, the **percentage of active students has increased from 78% to 87%** - this is also true for the new *I'm an Engineer* event. This high percentage of active students is reflected in the number of questions asked, which, in both cases is greater than in 2013. As a consequence of this large number of questions, the moderation of the question needed to be stricter - in order to avoid overloading scientists- and a lower percentage of questions were approved this year.

Importantly, we **doubled the number of schools taking part** in *I'm a Scientist*: from 23 schools participating in our event last year, we went up to 49 schools registering students in November 2014.

Workplace	Number of scientists
Trinity College Dublin	4
Dublin City University	2
University College Dublin	3
National University of Ireland Galway	2
Queen's University Belfast	2
University College Cork	2
The Environmental Protection Agency	1
University of Ulster	1
Armagh Planetarium	1
Institutions outside of Ireland	2

Career stage	Number of scientists
PhD Student	10
Postdoctoral	3
Lecturer	5
Industry and private sector	1
Other	1

Sector	Number of engineers
Academic	5
Industry and private sector	4
Government and public sector	1

3. Benefits

1.1. Teachers

We asked all the teachers to fill in an online feedback survey after the event ended. 19 out of the 58 teachers who took part in *I'm a Scientist*, and 7 of the 24 who took part in *I'm an Engineer* filled the survey in.

92% of the teachers said they are “very satisfied” with *I'm a Scientist*, and 8% said they are “Quite satisfied”. **In the case of *I'm an Engineer*, 57% of teachers said they are “very satisfied” and the rest are “quite satisfied”**. No single teacher said that they are “not satisfied” or “very dissatisfied” with any of the two events.

Although the samples we have are very small and it is very difficult to draw any firm conclusions from this, we aim for the best, and we want to know why the percentage of “very satisfied” teachers is lower in *I'm an Engineer* (57%) compared to *I'm a Scientist* (92%).

One of the most important things we ask teachers in the survey is whether they think their students have a more positive view of STEM after taking part. Of note, one teacher who took part in *I'm an Engineer*, disagreed with this statement, and three of them said they had not gain any ideas for teaching in the future.

One teacher pointed out that “As we took part in both *I'm a Scientist* and *I'm an Engineer*, I felt that the events were too close together. We needed more time to devote to each but spent less as we were dividing ourselves between both.” As we will be running another *I'm an Engineer* event as part of Engineers week next February, we will see if the take up improves when the two events are not “competing” for teacher’s time.

Another teacher said that we could provide “More ideas about how to teach children more about engineering and the work of engineers at primary level, that would build on the curriculum. These could simply be links on the website”. We will add a link to STEPS Engineer’s Ireland students’ and teachers’ resources in the teacher page in the *I'm an Engineer* site.

1.2. Scientists

We asked all the scientists to fill in an online feedback survey after the event ended. At this point, half of the scientists and engineers have filled the survey in.

- **Scientists have improved their communication skills and get to understand what students think about science**

100% of the scientists and 80% of the engineers thought participating made their communication skills better, and all of them had a better understanding of how students view science and engineering after the event. 80% of the scientists and engineers who responded felt re-energised about their work.

- **Scientists think that the event and Public Engagement in general is enjoyable, and useful to them, and they plan to do more of it in the future.**

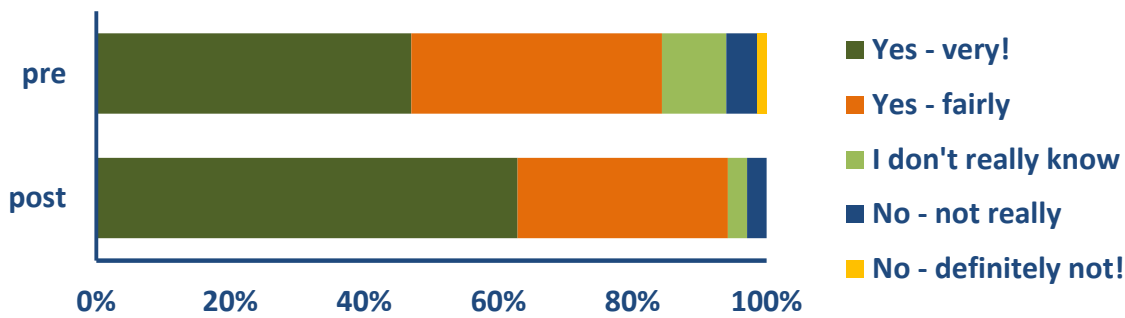
All of the scientists and engineers who filled in the survey said that they had enjoyed taking part in the events, and 90% of scientists and 100% of engineers would recommend it to a colleague. All of them agreed that they want to do more public engagement as a result of taking part in *I'm a Scientist* or *I'm an Engineer*.

1.3. Students

- **Students change their perception of engineering**

I'm an Engineer really got the students excited about engineering! Before taking part of the event, up to 16% of the students who filled in the survey didn't think that engineers have an interesting job. This percentage decreased to 6% in the post-event survey. Moreover, the percentage of students who said the job is “very interesting” increased from 47% to 62%.

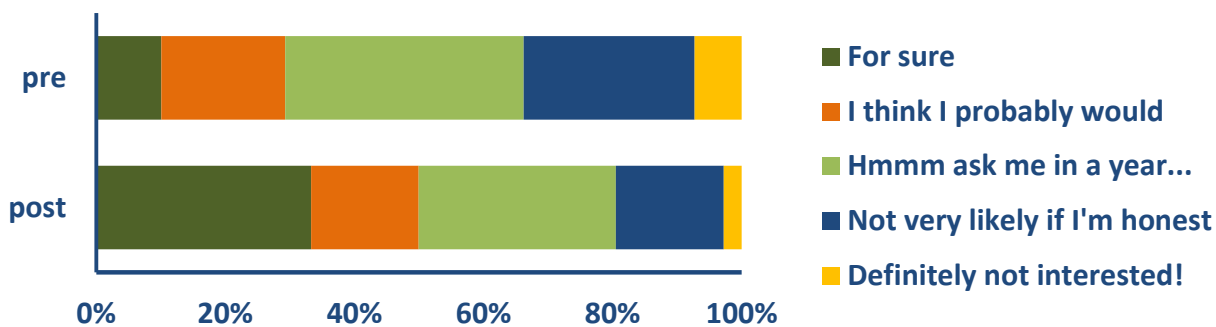
Do you think engineers have an interesting job?



- **Students get inspired to become engineers.**

In the pre-event survey, only 10% of the students who filled in the survey were sure they'd like to work as engineers in the future. However, this percentage increased to 33% after participating in *I'm an Engineer*. On the other hand, the percentage of students who said they are "definitely not interested" in becoming engineers, decreased from 7% pre-event data to 3% in the post-event data.

Would you like to work as an engineer in the future?



- **Students get a better understanding of what engineering is and what engineers do**

All the teachers who filled in the feedback survey agreed that their students understand what an engineer does better after taking part in the event.

On top of this, we asked students to tell us what an engineer is in the pre and post event surveys. We gave them the following options:

1. I don't really know
2. Someone who operates engines and machines
3. Someone who fixes engines and machines
4. Someone who builds and maintains engines and machines
5. None of the above

None of the descriptions offered are completely accurate, so "None of the above" might be the most sensible choice. However, we need to take into consideration that not a lot of students will consider this a "safe" option.

We found out that the number of students who chose "none of the above" increased from 11% in the pre-event survey to 17% in the post event one. Interestingly, there were no students who chose "I don't really know" in the post-event survey. We are thinking of more efficient ways of evaluating how *I'm an Engineer* affects the understanding that students have of what being an engineer is.

Both *I'm a Scientist* and *I'm an Engineer* are getting students enthused about science and engineering, by exposing them to the cutting edge science and engineering happening across Ireland. Students get inspired to become the scientists and engineers of the future, as they see how they can apply what they learn in school in the real world. All of this is achieved thanks to the unique online and interactive nature of these events, in which the students have their own say.

4. Audience

Primary Audience:

Our target audience are students of Primary Level, Junior Cycle (Secondary Level) and Senior Cycle (Secondary Level). The students are given access to the site by their teachers, who we promote the event to.

During these two events our primary (officially signed up) audience was composed of:

20 scientists + 58 teachers + 1,641 students = **1,719 people in *I'm a Scientist***

10 engineers + 24 teachers + 415 students = **449 people in *I'm an Engineer***

Secondary Audience:

Additionally to the interactions that have already been reported before, we had over **15,000 non registered unique visitors to the *I'm a Scientist* site and 1,500 in *I'm an Engineer* site.**

4.1. Geographical area impacted by the project

Of the **49 schools that signed up in *I'm a Scientist***, **4 were in Northern Ireland, and the remaining 45 were in the Republic of Ireland.** All the schools in *I'm an Engineer* were in the Republic of Ireland.

The map shows the distribution of schools in *I'm a Scientist* (pink) and *I'm an Engineer* (green). There's a large cluster of schools in Dublin but there are others spaced around the country.

Three international schools took part in *I'm a Scientist*. One school from France took part in the Evolution Zone – as this zone was funded by the European Society of Evolutionary Biology– and two schools from the United States took part in the Boron Zone. This was because we weren't oversubscribed at the time, and there was an important interest from these two schools.

On top of this, one of the engineers was based in the United States, and one of the scientists was based in France.



5. Learning

5.1. What worked?

We got a great response from students, teachers and scientists:

When asked how *I'm a Scientist* and *I'm an Engineer* compared to other forms of STEM engagement or dialogue they might have been involved in, most scientists and engineers said that **the events were much more direct, faster and interactive, reached a wider student audience, and students were much more willing to ask questions.** Another quality that they highlighted was that **the engagement lasted longer** than other outreach events, allowing a more profound engagement and a better understanding of how science and engineering work.

"The informal nature made it much more comfortable to discuss things, and much easier to break down complicated ideas to understand pieces." – scientist

"Takes place over a much longer time. Usually engagement is an afternoon session or an evening talk." – scientist

“The fact that some of the questions were silly and I could answer sometimes in a jokey way meant that the ice was soon broken and they were able to ask all kinds of things (like how much do you earn!) and thus get a better picture of the engineering profession” – engineer

Throughout the event, students left comments that stated clearly how they were enjoying and learning at once. They liked that the event was so interactive and that they had an active part at every step: asking, commenting, chatting and voting.

“That is really interesting engineers! I might take on the role myself 😊.” – Ore Jay, student in I’m an Engineer.

“I love ur work ur amazing scientist hopefully I will grow up 2 be up 2 be like u!!!!” – amy, student in I’m a Scientist.

5.2. What didn’t work? Learning points

There are also things that we can improve:

We’ve recently changed our **student registration process**. We give students a generic username and password, and they can later change their username. However a lot of students kept the original username, which was just a series of numbers and letters. This way, it was fairly difficult to distinguish different users during live chats, and several scientists and engineers highlighted this point.

There was one engineer who was concerned about the quality of the student questions in *I’m an Engineer*, compared to *I’m a Scientist*. This might be due to the students having difficulties relating to engineering or understanding what it actually is about. If this was the case, it is a strong reason to keep running *I’m an Engineer* Ireland in the future.

The Kelvin Zone in *I’m an Engineer* got very few registered students (116), leaving us way behind our target number of 330 students per zone. The other zone in *I’m an Engineer* – the Energy Zone – got 299 registered students, which still doesn’t reach our target number, but it doubles the Kelvin Zone. We don’t know why more than half of the teachers who registered in the Kelvin Zone decided to not take part after all. We will contact these teachers to try to find this out. However, sometimes this is just due to the schools’ situation.

6. Evaluation

The project has been evaluated using quantitative and qualitative data and methods, including:

- Pre and post event online surveys for students, teachers and students.
- Analysis of web statistics on site usage allows us to benchmark against sister and past events, and to compare zones.
- School analysis: location in Ireland and a comparison between schools and teachers who register but don’t take part and those who actively participate.
- Scientists’ analysis: to check that we have a broad range of scientists in terms of age, discipline, career stage and place of employment.

7. Media coverage

We didn't pursue any traditional media coverage, but there was an article posted in the Engineers Journal (online media): www.engineersjournal.ie/engineers-wanted-answer-students-burning-questions/

A school taking part in *I'm a Scientist*, pointed us towards a news story at Galway's television channel, in which the talked about the event: <http://ingalway.tv/video.php?v=24>

Hashtags were used during the events (#IASIE and #IAEIE) to allow the quantification of our impact in twitter. There were a total of 271 #IASIE tweets, of which more than 190 were from scientists, teachers and other members of the Irish *I'm a Scientist* community, but not the core *I'm a Scientist* team.



8. Future Directions

So far, *I'm a Scientist* has worked very well in Ireland. It translated nicely to the Irish curriculum, and got students talking to scientists.

This has been our first year running *I'm an Engineer* and, although we have fallen a little short in the number of registered students that we were aiming for, teachers, students and engineers gave positive feedback on the event. We plan to run *I'm a Scientist* again next year in November, and, thanks to early notification of future funding from SFI, we will run another *I'm an Engineer Zone* in February 2015, as part of Engineers Week, and two additional zones in November 2015.