



# Evaluation report

## Human Limits Zone

### June 2013

Funded by The Physiological Society

The screenshot shows the Human Limits Zone website interface. At the top, there is a navigation bar with the 'I'm a Scientist Get me out of here' logo on the left, a 'Meet the Scientists...' section with five scientist portraits (Luca, Liam, Emma, Damian, Alan) each with a pink 'Evicted' banner, and the 'Human Limits Zone' logo on the right. Below the navigation bar, there are links for 'Ask?', 'Chat', and 'Vote'. The main content area features five scientist profiles, each with a profile picture, a name, and a 'Me and my Work' section. Each profile also includes a 'Latest Question' and a 'Latest Comment' section. The profiles are for Luca Angius, Liam Bagley, Emma Ross, Damian Bailey, and Alan Richardson. Each profile has a pink 'Evicted' banner over their profile picture.

Scientist Name	Me and my Work	Latest Question	Latest Comment
Luca Angius	Me and my Work: <a href="#">Read more about me</a>	Latest Question: No questions to show	Latest Comment: No comments to display
Liam Bagley	Me and my Work: I give people very hard exercise to do and see how they improve to become fitter, leaner and healthier. Status: Cannot believe I've got to the final two among these amazing scientists! <a href="#">Read more about me</a>	Latest Question: <a href="#">why do you think you should win the prize</a>	
Emma Ross	Me and my Work: I am an exercise physiologist, which means I study how the human body works when we do physical activity. I am particularly interested in how the human brain works when we have to perform in extreme environments such as high heat or high altitude. <a href="#">Read more about me</a>	Latest Question: <a href="#">Do you think that in 200-300 years time</a>	
Damian Bailey	Me and my Work: Understanding the limits of human exercise performance (how high we can climb, how deep we can dive, how fast we can run) by determining how we can get more oxygen to our brains! <a href="#">Read more about me</a>	Latest Question: <a href="#">Which element of science biology, chemistry or physics get the most money put into them?</a>	
Alan Richardson	Me and my Work: Much of my research looks at how and why people tolerate extreme environments such as heat, cold and hypoxia (altitude). Status: Great questions from UCTC - Me and Emma were impressed!! <a href="#">Read more about me</a>	Latest Question: <a href="#">what sort of things do you do in one day?</a>	



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## 1. Executive summary

The Human Limits Zone in I'm a Scientist, Get me out of here! 17<sup>th</sup> – 28<sup>th</sup> June 2013 was **successful**:

1. The Human Limits Zone was busy. In most measures of activity such as the number of students, number of live chats, number of votes, lines of live chats and the % of students that actively participated, the zone was around or above the average of all zones. 343 of the 394 students who registered asked a question, talked in a live chat, voted or left a comment. It was just below average in terms of questions asked and answered though. See page 4.
2. The students really got into the zone theme. Students asked lots of questions on Human Limits, with extreme temperature being a particularly popular topic. Students asked about the limits of the human body, from how hot or cold the body can get before it shuts down, to how far we could dive underwater without breathing.
3. The zone theme related well to The Physiological Society's broad outreach theme of 'physiology in extreme environments'.
4. The scientists were challenged within and beyond their areas of research. All except Luca (who didn't take part despite emailing and phoning him) engaged well and were keen to answer questions and take part in the live chats. As Alan said to the students in a post on the site after the event ([humanj13.imascientist.org.uk/2013/07/02/thank-you-from-your-winner-alan](http://humanj13.imascientist.org.uk/2013/07/02/thank-you-from-your-winner-alan)) *"I hope taking part in this project has got you excited by science or at least thinking about how science relates to everything around us."*
5. The drop out rate for teachers was very low in the Human Limits Zone – 9 of the 10 teachers given places turned up with their students.

The Human Limits Zone was **less successful** in that:

1. One scientist, Luca Angius did not take part at all. After we offered him a place in the event he confirmed and sounded keen. When he didn't fill out his profile or answer any questions we tried to contact him with emails and phone calls but he didn't respond. This does happen occasionally but we try and minimise it.
2. It was more of a challenge than expected to recruit the 5 scientists in the zone – we usually avoid having 2 scientists from the same University but had 2 from Brighton in the zone as few applied. While the zone name appealed to teachers and fit into The Physiological 'physiology in extreme environments' outreach theme, it had less resonance with the scientists. It may be that scientists don't think of themselves as 'Human Limits Scientists' like Sports Scientists do, for example. We can increase the number of scientists applying in the future by communicating the zone theme better.

## 2. Introduction and background

### *I'm a Scientist, Get me out of here! (IAS)*

I'm a Scientist, Get me out of here! is an online event where students get to meet and interact with real scientists. It's an X Factor-style competition between the scientists, where students are the judges.



Students submit questions which the scientists will try to answer by the next day. Students then have live online Facebook-style chats with the scientists, where they ask questions, learn more about the scientists, and let scientists know their opinions. It takes place online over a two week period.

The event ran for the 12th time from 17<sup>th</sup> – 28<sup>th</sup> June 2013. In each zone there are 5 scientists and around 350 school students in 20 classes. IAS is designed to support the How Science Works curriculum and to bring real science to life for students, supported by carefully developed classroom resources. It helps:

- Develop discussion and critical thinking skills
- Cover key concepts in How Science Works
- Get students engaged with science
- Provide lesson plans, information sheets and resources for different ages and ability levels, between years 9 – 13

### *The Physiological Society*

Physiology is an essential discipline which seeks to understand how the human body works; the study of how cells, organs and muscles interact contributes crucial insight into human performance. The Physiological Society brings together more than 3,000 scientists from over 60 countries, and since their foundation in 1876, their Members have made significant contributions to the knowledge of biological systems.



The Physiological Society is committed to engaging with public audiences. Sponsoring I'm a Scientist meets many of their aims for outreach, including inspiring younger people to study physiology. They fund gold-standard public engagement projects like IAS through their [Public Engagement grants](#) scheme.

The Human Limits Zone was designed to fit in The Physiological Society's broad outreach theme of 'physiology in extreme environments'.

### 3. Activity in the zone

The Human Limits Zone ran alongside 17 other zones in I'm a Scientist in June 2013. The Human Limits Zone was just above average in most measures of activity such as the number of students, number of live chats, number of votes, lines of live chats and the % of students that actively participated. 343 of the 394 students who registered asked a question, talked in a live chat, voted or left a comment. It was just below average in terms of questions asked and answered though.

The Human Limits Zone started off busy during the first week, but became quieter in the second week. Four of the scientists answered questions and took part in live chats, but Luca didn't take part and was voted off first.

#### Page views of various pages in the Human Limits Zone

Zone page	Page views
<b>Total zone</b>	20,542
<b>ASK page</b>	1,947
<b>CHAT page</b>	2,553
<b>VOTE page</b>	1,473
<b>Luca Angius</b>	739
<b>Liam Bagley</b>	1,262
<b>Emma Ross</b>	873
<b>Damian Bailey</b>	714
<b>Alan Richardson</b>	1,095

#### Figures from I'm a Scientist June 2013 for the zone, the average of all 18 zones, and the whole event

	Human Limits Zone	Average of all 18 zones	Total in all 18 zones
<b>Number of registered students</b>	394	371	6,697
<b>% of active students (ASK, CHAT, VOTE or commented)</b>	87%	83%	-
<b>Number of questions asked</b>	595	963	17,337
<b>Number of questions approved</b>	318	309	5,558
<b>Number of students that asked questions</b>	134	154	2,766
<b>Number of questions asked per student</b>	1.5	2.6	-
<b>Number of questions answered</b>	180	272	4,894
<b>Number of answers given</b>	248	533	9,597
<b>Total number of comments</b>	62	73	1,306
<b>Number of votes</b>	327	276	4,962
<b>Number of live chats</b>	16	13	240
<b>Number of lines of live chat</b>	4,854	4,735	85,225
<b>Number of students who chatted</b>	305	244	4,391
<b>Number of schools</b>	9	8	138

## 4. Questions and live chats

Students asked lots of questions on the theme, with extreme temperature being a particularly popular topic. Students asked about the limits of the human body, from how hot or cold the body can get before it shuts down, to how far we could dive underwater without breathing.

Similar topics came up again and again both in the chats and in the questions. The effects of altitude on the body, why and how our bodies age, and how adrenaline works were just a few key subjects often asked about. Students sometimes commented on questions to thank the scientists for their answers.

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### Example questions in the zone

[What is the hottest and coldest climate a human could survive in?](#)

[Why do we see stars when we push ourselves too much?](#)

[Do we have the same amount of air in us when we do exercise as we do when we sleep?](#)

[Why are we less active when we are old?](#)

[Would it be possible to build inside mount Everest?](#)

[Do you think that in 200-300 years' time that computers will be able to function as well as the human brain does now?](#)

[Do we create muscles when doing exercise or do we build them up?](#)

[If our muscles get smaller as we get older, why are adults usually stronger than children?](#)

[When we get to the ages of 50+ why are we not as active? What happens to us?](#)

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### Examples of good engagement

There were some great discussions, specifically on 'human limits', in the chats:

*livok*: is the reason your in this field of science is to

see how far humans endurance can go with the help of science so they evolve better to the ever changing climate?

*liambagley*: Good question! I think so yeah, I think that human endurance can be pushed further than it is now. Look at Usain Bolt for example, he runs 100m about 2 whole seconds faster than the winning times about 100 years ago. And this is through modern science that he is able to train in a certain way to make him better. I think we can only keep getting better. But there must be a limit somewhere!

*livok*: But is the reason he run so fast due to the so called "fast gene" that they say some have?

*liambagley*: I don't think there is a "fast" gene so to speak, but there are genetics involved with how someone reacts to exercise. Everyone is unique. Also everyone is born with a set number of muscle fibres, you can't grow more, you just build the ones you currently have!

[age](#)<sup>3</sup> [atmosphere](#)<sup>2</sup> [biology](#)<sup>1</sup> [blood](#)<sup>2</sup> [body](#)<sup>3</sup> [brain](#)<sup>5</sup> [cancer](#)<sup>1</sup>  
[Cardiovascular](#)<sup>1</sup> [cheese](#)<sup>1</sup> [chemistry](#)<sup>1</sup> [cloning](#)<sup>1</sup> [dinosaurs](#)<sup>1</sup> [DNA](#)<sup>2</sup> [element](#)<sup>1</sup> [endurance](#)<sup>1</sup>  
[exercise](#)<sup>5</sup> [gas](#)<sup>1</sup> [how science works](#)<sup>2</sup> [human](#)<sup>3</sup> [human](#)  
[body](#)<sup>6</sup> [Injury](#)<sup>1</sup> [marine](#)<sup>2</sup> [muscles](#)<sup>4</sup> [neuroscience](#)<sup>1</sup>  
**Personal**<sup>7</sup> [physics](#)<sup>1</sup> [physiologist](#)<sup>1</sup> [race](#)<sup>1</sup> [research](#)<sup>2</sup> [respiration](#)<sup>1</sup> [school](#)<sup>1</sup>  
[science](#)<sup>4</sup> [sleep](#)<sup>1</sup> [temperature](#)<sup>1</sup> [space](#)<sup>3</sup> [speed](#)<sup>2</sup> [subject](#)<sup>2</sup> [team](#)<sup>1</sup>  
[temperature](#)<sup>7</sup> [ultrasound](#)<sup>1</sup> [water](#)<sup>1</sup> [win vote](#)<sup>1</sup> **Work**<sup>11</sup> [work routine](#)<sup>3</sup>

Key words in the Human Limits Zone. Moderators tag the keywords in each question so when people are browsing the website, the site can suggest 'related questions' on a similar topic that they might also want to read. The size of the word represents its popularity; the superscript number indicates the number of times it was tagged as a key word.



The most popular used words from the Human Limits Zone live chats that took place over the event. The size of the word represents its usage and popularity.

## 5. Participation

### Scientists

The 5 scientists in the Human Limits Zone were all members of The Physiological Society. They were based at a range of institutions in the UK.

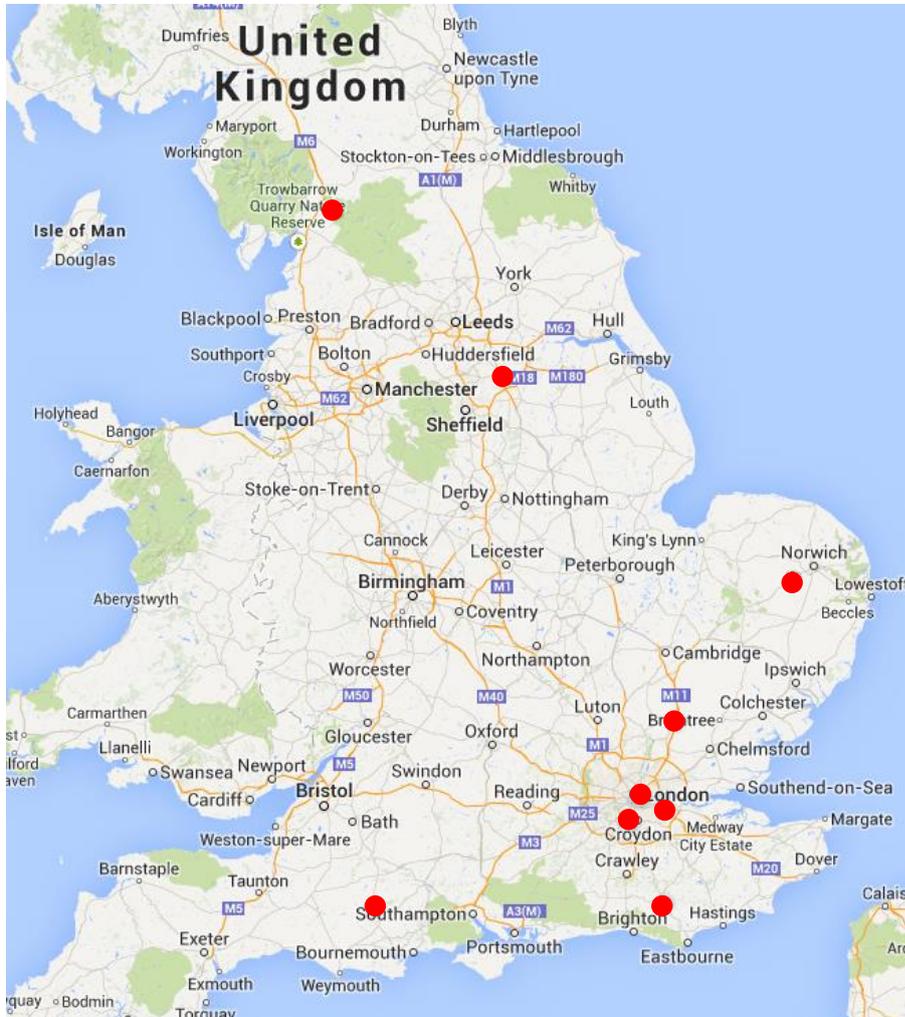
There were a total of 327 votes cast in the Human Limits Zone. There were four rounds of voting with one scientist evicted at each round. Students could cast their vote in each round. **Alan Richardson** was crowned the winner of the Human Limits Zone.



Scientist	Institute	Brief description of their research, written by the scientist for rating by students & teachers	Result	% of votes	Number of profile views
<a href="#">Alan Richardson</a>	University of Brighton	I investigate how Fire Instructors tolerate going into fires as part of their everyday work and whether this causes them to get ill, from this I try to research the best practices to reduce the impact on their health	1st	41%	1,095
<a href="#">Liam Bagley</a>	Manchester Metropolitan University	I give people very intense exercises to do, then slice tiny pieces of muscle out of their leg and take their blood to analyse it to see if their health has improved, as well as making them fitter and less likely to get a diseases like Diabetes or Heart Disease	2nd	38%	1,262
<a href="#">Emma Ross</a>	University of Brighton	I look at how our body (particularly the central nervous system and muscles) works in extreme environments such as high heat, or low oxygen.	3rd	11%	873
<a href="#">Damian Bailey</a>	University of South Wales	I'm interested how "super-human" extreme athletes get enough oxygen to their brains which sets the limits to how high they can climb, how deep they can dive, how fast they can run and funnily enough, how long they can live!	4th	8%	714
<a href="#">Luca Angius</a>	University of Kent	Cardiovascular and nervous regulation during physical exercise	5th	1%	739
The five scientists in the Human Limits Zone					

## Schools

9 of the 10 schools given places in the Human Limits Zone turned up. This drop out rate is lower than expected. As shown on the map below there's a good spread of school locations round the country, with a few clustered in London.



The location of the 9 schools in the UK that took part in the Human Limits Zone

## 6. Publicity

I'm a Scientist ([@imascientist](https://twitter.com/imascientist)) regularly tweeted event updates and popular questions asked across all zones and linked to [@ThePhySoc](https://twitter.com/ThePhySoc). Three of the Human Limits scientists (Alan, Liam & Emma) were on Twitter and tweeted about the event.

-  **I'm a Scientist Team** @imascientist 30 Apr  
We're looking for [@ThePhySoc](https://twitter.com/ThePhySoc) members, pushing research to the limit, for the Human Limits Zone in June! [bit.ly/wkkUfh](https://bit.ly/wkkUfh) #IAS2013  
Retweeted by PhysiologicalSociety  
Expand
-  **Physiological Society** @ThePhySoc 11 Jun  
MT [@imascientist](https://twitter.com/imascientist): Taking part in the Human Limits Zone we have [@AlanRichardson\\_Luca](https://twitter.com/AlanRichardson_Luca), Liam, [@ezross](https://twitter.com/ezross) & Damian [humanj13.imascientist.org.uk/scientists/](https://humanj13.imascientist.org.uk/scientists/) #IAS2013  
Expand
-  **annahalford** @anhalf 20 Jun  
[@KDWScience](https://twitter.com/KDWScience) [@imascientist](https://twitter.com/imascientist) cool, we were in human limits. Scientists were gr8 wit responses to chn, they were bouncing with excitement  
[View conversation](#)
-  **Liam Bagley** @LiamBagley23 24 Jun  
Learning all sorts of stuff on [@imascientist](https://twitter.com/imascientist) How about this, a DNA paintball gun, these kids are pure schooling me! [bit.ly/14szykL](https://bit.ly/14szykL)  
Retweeted by I'm a Scientist Team
-  **I'm a Scientist Team** @imascientist 24 Jun  
If you fancied taking a peek at a live chat in action, the Human Limits zone is a good one - [humanj13.imascientist.org.uk/talk/](https://humanj13.imascientist.org.uk/talk/) #IAS2013  
Expand
-  **Alan Richardson** @AlanRichardson\_ 24 Jun  
[@imascientist](https://twitter.com/imascientist) Manic 30mins of typing. Best question: At high G forces, which organ is effected the most and how?  
[View conversation](#)
-  **I'm a Scientist Team** @imascientist 25 Jun  
"When we get to the ages of 50+ why are we not as active? What happens to us?" [humanj13.imascientist.org.uk/2013/06/24/wher...](https://humanj13.imascientist.org.uk/2013/06/24/wher...) [@ThePhySoc](https://twitter.com/ThePhySoc) #IAS2013  
Expand
-  **I'm a Scientist Team** @imascientist 28 Jun  
And thank you to The Physiological Society for funding the fab Human Limits Zone [@ThePhySoc](https://twitter.com/ThePhySoc)  
Expand
-  **Physiological Society** @ThePhySoc 28 Jun  
Congrats also to PhySoc Member [@KeithSiew](https://twitter.com/KeithSiew) for winning the Hormones Zone - well done! [bit.ly/14AkRu3](https://bit.ly/14AkRu3) ... [@Cambridge\\_Uni](https://twitter.com/Cambridge_Uni) [@TheBHF](https://twitter.com/TheBHF) #IAS2013  
Expand
-  **I'm a Scientist Team** @imascientist 28 Jun  
A big well done to the Human Limits Zone champion [@AlanRichardson\\_](https://twitter.com/AlanRichardson_)! [humanj13.imascientist.org.uk/profile/alanri...](https://humanj13.imascientist.org.uk/profile/alanri...) #IAS2013 [@thephysoc](https://twitter.com/thephysoc) [@uniofbrighton](https://twitter.com/uniofbrighton)  
Retweeted by PhysiologicalSociety  
Expand

## 7. Benefits and quotes

### Scientists

Scientists improved their communication skills and often found a renewed vigour for science and their research. Here are some of their comments:

*“The questions some of you guys came up with was quite outstanding. Sometimes I found myself sitting at my computer during a chat thinking, why didn’t I ever think to ask that?”* – Alan Richardson, scientist

*“Awesome questions guys, really good, enjoyed it! My fingers hurt now from furious typing! I’m an old man!”* – Liam Bagley, scientist

*“You’re on a roll with these questions buddy!”* – Liam Bagley, scientist

*“@mjbittan - what a great question!”* – Emma Ross, scientist

*“I hope taking part in this project has got you excited by science or at least thinking about how science relates to everything around us.”* – Alan Richardson, scientist

### Students

Students gained an increased awareness of what scientists actually do and what scientists are like.

Students engaged in debates with scientists, after scientists answered questions. Students felt empowered enough to tell scientists their views and discuss topics with them. It also showed students that scientists don’t always know the answer. Scientists were challenged by the questions asked.

Many Human Limits Zone students left positive comments during or after live chats, including:

*“Alan your so smart, i wish i was u”* – bettysue10, student

*“Thanks for answering my questions @liam @alan”* – cherylnewton, student

*“you guys are amazing bye”* – geriisastar, student

*“Thank you very much for your time, this period has been very educational and has been a pleasure reading your interesting answers towards people’s questions”* – theqprotocol, student

*“Goodbye. I think we have to go. Thank you so much for answering our questions!”* – 12clcranfield, student

Teachers noted how their students had benefited from taking part:

*“we were in human limits. Scientists were gr8 wit responses to chn, they were bouncing with excitement”* – Anna Halford, Teacher, on twitter