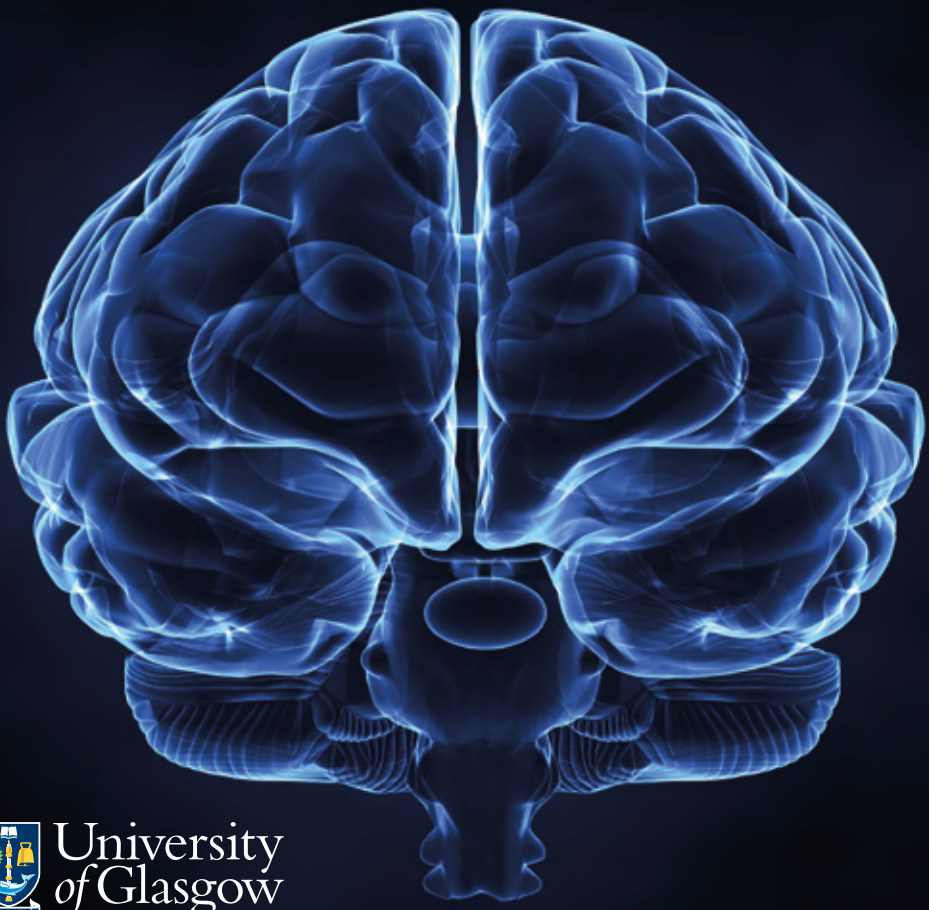
Sci·ence Slam

sci·ence slam | ' sī-ən(t)s ' slam | *noun*

1 form of edutainment; knowledge transmission live and on stage
2 chance for normal people to observe scientists outwith their natural habitat as they attempt to communicate their work to the real world (for free)

Un-leash Your Inner Geek

July 19th 2013, Cottiers, 93–95 Hyndland Road



University of Glasgow

Intro.

Professor Jon Cooper
Dean of the Graduate School

The Science Slam is an interesting development for the Graduate School; although it is an evening of fun and entertainment, events such as this are important in helping to create a Graduate School community and promoting the interests of students from across the College of Science and Engineering.

Our vision is that the Graduate School supports excellence; that it allows our students to thrive and to make the most of their time as doctoral researchers at the University. We have spent the last three years recruiting the very best doctoral researchers and we hope that we can now start to build internal links between the students from the different Schools in our College.

The response to the Science Slam event has been hugely encouraging; from the creative, interesting ideas from our students and their willingness to embrace something new (this is the first Science Slam in Scotland and I am told possibly in the UK) to the fact that the wider community of researchers and industry-partners has resulted in us having to increase the ticket allocation!

It is a pleasure to be Dean of the Graduate School and to work with such engaged and enthusiastic students. As the measures of the University's success include our public engagement work and ensuring that research has impact in wider society, events such as the Science Slam are of increasing importance.

Should any of you have any additional ideas for events or activities which would enhance our Graduate School further, particularly in terms of our engagement with industry, schools or, more broadly with the community, I would be delighted to hear from you.

I do hope this event is the first of many and good luck to all the participants.

Heather Lambie
Graduate School Administrator

At first no one wanted to be involved in the Science Slam ('I've never heard of such a thing', 'just 'cause it's popular in Germany doesn't necessarily mean it should be popular in Glasgow') but then it turned into one person who agreed they would like to stand up and talk in front of an unknown number of people to present their research in a completely new and unknown way with no rules at all (well, bar how long they get, otherwise the completely new way of presenting their research could be a 24 hour non-stop monologue) and then an enthusiastic and creative German person (but this is coincidence) joined the organising committee and was sufficiently enthusiastic that the idea was not shelved. And so, nine months later, we have eight students participating and have 'sold' 140 tickets. And we are already talking about this as the first in a series of events! I am really, really hoping it is a success. I would like this Graduate School to be the 'best' Graduate School in the country (I am not allowed to put this in our strategy so will put it on paper here) and to provide support for students which goes beyond what they hoped research study at the University of Glasgow could be.

Research students are fantastic to work with and seeing/hearing/watching what they have come up with for this event has completed exceeded my expectations. I hope they exceed yours too!

Some formal thanks: most importantly to Meike Ramon (an integral part of the event and designer of the fantastic science slam image), Judith Robertson for dealing with the many, many things which needed organising and coping with increasingly odd requests, Soum Chowdhury for flyering and sound marketing ideas, the research students who have volunteered to help with tickets (names not known at time of writing!), our soon to be famous eight original participants, the musicians, Sian Bevan our host for the evening, Cottiers, Tim for the podcasting expertise, Dol Eoin and Sarah Kerrson for videoing and to everyone who has chosen to spend this Friday evening with us instead of doing something far less interesting!

Order of Play

19.30	Welcome
19.40	Stefan Raue
19.50	Alan Kelly
20.00	Piotr Jacobsson
20.10	Music
20.30	Jamie Gallagher
20.40	Harry Smith
20.50	Rebecca Douglas
21.00	Music
21.20	Niall Macdonald
21.30	Lewis Mackenzie
21.40	Music
22.00	Audience votes collected & winners announced

Audience Instructions

A science slam is a mirror of democracy. It has a simple voting process that could quite easily go wrong and result in the wrong person winning and then you having to put up with them for years. The instructions are as follows:

Each table represents a voting cohort. As a table you must become a unified voice and select your top three participants. Your number 1 choice will get 10 points, number 2, 7 points and number 3, 5 points. We will then add all the points together and hope that this results in an actual winner, rather than 8 people with the same number of points. You will find a clipboard and a pencil and a form on your table. Please use discussion, persuasion, innovative systems within systems to decide on your group's top 3. If this doesn't work, a hastily convened judging panel will take over and use their will to impose an oligarchy instead.

Voting rules:
The winner will receive £500 so use your votes wisely.
No resorting to violence.
No bribing your cohort with your drinks vouchers.
No swapping your votes for cash.
No nepotism.

19.40

Abstracts

Stefan Raue –
School of Computing Science
When Twitter Goes Wild. . .

19.40

Whenever something happens, one can be sure to find out quickly on Twitter – a micro blogging platform allowing users to post 140 character messages – or any other social media platform. Everyone can have their say and they often do, with a whopping 15,385 tweets per second during the Euro 2012 finals, 10,245 tweets per second at the end of the Super Bowl XL VI, and 6,303 tweets per second during the UEFA Champions League final. But, it is not only sport that excites people. Messages exchanged during the Japanese earthquakes reached volumes of up to 5,530 tweets per second, with a considerable number of messages coming from affected areas like Tokyo itself. But, what can we learn from these messages, especially in times of crisis? What kind of information is shared on social media platforms, and do these messages contain information that can help emergency responders to find people and to allocate resources more efficiently? How can anybody deal with such immense volumes of information without getting overwhelmed? How can we build systems that make our communities more resilient during natural and man-made disasters? I do not claim to have all the answers. However, we will discuss what the future of disaster response might look like and what role social media platforms, like Twitter, might play in it.

19.40

Alan Kelly –
School of Engineering
HPC – High Performance Comedy

19.50

High Performance Computing (HPC) is used in all areas of science, from biology to particle physics and even the social sciences. I shall attempt to explain what many consider a dark art in an interesting and funny way. The UK national supercomputer, HECToR (which stands for what I'm not quite sure) is used to solve problems in chemistry, study climate change and for weather forecasting. At this point I must warn you that the use of bad acronyms is prolific across all areas of HPC. I will suggest alternatives.

I will also focus on the stereotype of the computer programmer and why you should marry one if you can. I'll discuss the impact 12 hour programming sessions have on the mind.

By the end of this talk you'll understand the important work being carried out by these scientists and you'll realise just how attractive, interesting, funny and appealing computer programmers really are.

Q. How did the programmer die in the shower?
A. He read the shampoo bottle instructions: Lather. Rinse. Repeat.

Piotr Jacobsson –
Scottish Universities Environmental Research Centre (SUERC)
A Universal Bayesian Problem Solver

20.00

Some unbiased mathematicians propose that application of the Bayesian paradigm will solve all if not more than all of our problems. To disagree with such a balanced opinion seems most inconsiderate at least. So imagine how surprised I was when one day an esteemed lawyer told me that mathematical probability may not be universally applicable. He based this preposterous notion on his experience of court trials, where allegedly matters discussed can become so complicated that they evade quantification.

This strange encounter left me perplexed beyond bounds. So I contacted the Grand Academy of Lagado to set up a joint project to research this matter. Before long we came up not only with a theoretical refutation of this aberration of reason and return to Tomism (or something worse), but we also developed a sophisticated spreadsheet that will let you solve all your problems in a mathematically mathematical fashion.

The spreadsheet allows inputting everyday experiences into successive iterations of the Bayes formula. By defining our beliefs about the surrounding reality and multiplying them by our standardised newly acquired data, we can solve all our problems not only in matters of science, but also in matters of life both personal and public. The sophisticated device that this talk introduces allows doing all these things with minimal concerns for the outcry of the uneducated Luddist obscurant, who only yesterday cried that the industrial revolution is not such a great idea!

References:
Swift, J. 1726-7. Gulliver's Travels into Several Remote Nations of the World. Part III: A Voyage to Laputa, Balnibarbi, Luggnagg, Glubbdubdrib, and Japan.

Jamie Gallagher –
School of Chemistry
Hot and Powerful

20.30

Energy, we all need it and sometimes it feels like we never have enough - but what is it? What does one unit of energy look like? feel like? I am an energy materials scientist - and both hot and powerful [that's to say radiating heat at around 50 joules per second]. Join me for a whirlwind tour of all things energy, from the mechanical actions of our body to the extraordinary amount of energy bound up in every mouthful of our dinner each night. You will look at the world in a new light and may even get all the motivation you need for that diet that was supposed to start yesterday.

Volunteers may be required!

Harry Smith –
School of Engineering
Analysing Aircraft Propellers
Without a Sledgehammer

20.40

Propellers have been in use since the birth of aviation, but modern-day propeller aircraft are very different from early ones. Though the basic propeller principle is the same, the range of operating conditions means that the blades bend and flex with each turn and this means they have got to be designed to withstand this stress.

Most modern software to analyse this bending use hefty computational techniques taking months of calculation. My research argues that these techniques are overkill for the problem at hand; we've been able to analyse simple cases for aircraft propellers for over a century, so we can extend those simple and elegant techniques to the problem at hand.

Rather than talking about how my code is written, tonight will be a demonstration of the physics involved on an inclined propeller - and an explanation of how understanding this leads to a simple model without using a supercomputer.

Rebecca Douglas –
School of Physics and Astronomy
Searching for Wobbles in Space

20.50

Einstein said space was wobbly. If he was right (and he usually was) how come we've not seen any wobbles yet and how will we find them? Cryogenic detectors deep underground may have the answer which will open a new window on the universe.

Niall P Macdonald –
School of Engineering
Fish in 3D chips

21.20

Despite the risk of finding horsemeat in your lasagne, our food today is really very safe. The same goes for shampoo which causes no more harm than stinging your eyes. To get there, new substances have to go through stringent controls and some of them still require thousands of animals in the process, helping us to advance pharmaceutical research, food science and medical research.

However, this is not a story of fatalities, instead it introduces a new breed of superheroes and their gadget arsenal that has the potential to revolutionise safety testing. It is a boat? Is a plane? No it's a. . . . . zebrafish! A super replacement for substance testing! Toxicity, your days are numbered!

Superfish and his friends possess powers that allow them to shield humanity from The Toxins:

Super powers anaylsis
Spine – makes him a better comparison to humans (his friends Fruitfly and Roundworm are quite jealous about this)
Transparency – Almost the invisible fish! We can see his blood flowing and heart pumping. This allows us to see if the drugs have harmed him.
Glowing organs – Working in unison with his transparency his glowing powers allow for changes made by the Toxins to be easily spotted.
Small – compared to his furry friends, Superfish can fit into small spaces and be very comfortable. Veritable armies of Superfish can be assembled to take the Toxins head on. Safety in numbers they say and in this case it's no different; more fish = more data!
Feels no pain – Superfish has an unfair advantage over the other Human Defenders in that he feels no pain when keeping The Toxins at bay.

I know the last one is a bit dubious, but it's been scientifically proven!

Superfish, like any good superhero, has a wealth of gadgets at his disposal for aiding him in his fight against The Toxins. Using transparent high resolution 3D printing, Superfish will automatically arrange themselves into ordered lines. This makes it easier to work out which fish are having trouble dealing with toxins. In order to do this however we need a microscope and computer to watch and record what happens. Later on once the Superfish have completed their objectives someone, like me, can work out what the Toxins did to them.

We want to improve and expand the gadgets for Superfish to aid him in his honourable mission to protect humans from Toxins. The other Human Defenders still have a place, however, Superfish has the capacity to not only help us, but help out animals in labs all over the world.

Superfish and his gadgets are a solution for making our food, drugs and cosmetics safer while saving animal lives.

Lewis Mackenzie –
School of Physics and Astronomy
I want to see your blood (vessels)

21.30

Do you hate needles? I hate needles too.

Imagine if doctors could take a picture of the tiny blood vessels in your skin, map how much oxygen is in your blood, and use that information to tell if you had a disease such as diabetes, without you having to go near a needle! Not only would such a technology save a lot of tears, but it would also be incredibly useful: allowing doctors to find the early signs of horrible diseases like diabetes, and treat them before you come to serious harm.

My research is focused on developing new imaging technology to hopefully make such a vision possible. The bottom line is that if such an imaging technology could be made widely available, it could save hundreds of thousands of lives and reduce worldwide healthcare costs by billions of pounds.

The biology bit: **We have a vast network of blood vessels that transport oxygen around our bodies to where it's needed. Nasty diseases (like diabetes, heart disease, cancer, etc) all affect this network of blood vessels to various extents. Some diseases are greedy and want more oxygen brought to them, some create new blood vessels to serve them, and some cut off blood flow entirely. These nasty effects are most apparent in the tiny blood vessels in your skin, which are known as capillaries.**

The physics bit: **Ultrasound, MRI, and X-rays are commonly used imaging techniques that most of us know of from TV or firsthand experience. Unfortunately none of these techniques can create pictures of our tiny capillaries. On the bright side, optical (visible-light) imaging techniques can create images of these small capillaries, and we can map out how much oxygen is in our blood by taking images at multiple wavelengths (colours) of light.**

The tricky bit: **Have you noticed how your skin isn't transparent (no matter how fair you may be)? This is because skin blocks light, making it difficult to create images of our blood vessels. The solution is to use advanced imaging techniques to get around this problem, and this is the focus of my research.**

I'm Lewis MacKenzie, and I want to see your blood... (vessels)!

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