



Dundee Science Festival 2011 Report

A science festival coordinated by Dundee Science Centre



DUNDEE SCIENCE CENTRE
 **sensation**

Two weeks

Over 10,000 participants

Over 40 partners

Over 20 venues

One city of science

"The University of Dundee considers Dundee Science Festival as a fantastic opportunity for our researchers and local people to come together to discuss the latest scientific issues and the University's ground-breaking research. With University of Dundee staff and students participating in half of this year's events it is clear that the Science Festival acts as a catalyst for our researchers to take their work beyond the walls of our research buildings and to the heart of the local community. We look forward to supporting it in future years."

Professor Pete Downes, Principal of University of Dundee

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“What I found particularly impressive about Dundee Science Festival was the range of very exciting and engaging activities available across the city, particularly the practical demonstrations and lively discussions that ensued from them. This is only its second year but it already seems to have picked up significant momentum and has really put Dundee on the science map.”

**Professor Mike Chantler, Heriot-Watt University,
RCUK Digital Economy Programme**

Executive summary

Building on the success of Dundee's first two-week celebration of science in 2010, Dundee Science Festival 2011 reached over 10,000 visitors through its diverse programme of over 60 events hosted in 25 venues across the city and outlying areas.

Events ranged from baby classes to adult-only stand up comedy nights, from primary school workshops to teacher professional development, from family science shows and workshops to lectures and debates, and from dance performances to exhibitions, tours and trails.

In line with the festival's aims and ethos, events featured local, cutting-edge science and technology, showcasing Dundee as a city of scientific discovery and innovation, and further integrating science into its culture.

Led by Dundee Science Centre, the festival was delivered by Dundee Science Festival Partnership: a collaboration of partner organisations from Higher Education, Further Education, local government, industry, education, heritage, media, hospitality, community, arts and research sectors. Over 40 partners came together in this joint initiative to celebrate science and lifelong learning.

Growth of the partnership and support of the festival enabled a considerable expansion in the number and breadth of events from the festival's inauguration in 2010. Awareness and recognition of the festival also grew from last year. Together, this resulted in engagement of new audiences and a 14% increase in overall visitors, of whom approximately 68% were from Dundee, 26% from the rest of Scotland (predominantly from neighbouring Angus, North Fife and Perth and Kinross) and 6% from the rest of UK/overseas.

Visitor impact evaluation indicates that participants experienced high levels of enjoyment and learning: a powerful combination. Visitors felt likely to recommend the festival to others, and, claimed that the festival made science feel relevant to their everyday life. These outcomes in combination provide a powerful force for the establishment of the festival's key aim: a culture of engagement with science.

"My class came away buzzing, looking forward to sharing their information at home"

"I enjoyed watching my child's face light up as they watched the experiments"

"Educational, entertaining and lighthearted"

"It was interesting, inspiring and fun!"

Dundee Science Festival 2011 visitors

Acknowledgements

Led by Dundee Science Centre, the festival was delivered by Dundee Science Festival Partnership: a collaboration of partner organisations from Higher Education, Further Education, local government, industry, education, heritage, media, hospitality, community, arts and research sectors.

This year saw a significant increase in the size of the Partnership, which developed from 29 partners in 2010 to 43 partners in 2011, representing a collaboration of diverse stakeholder organisations from academia, industry, culture and beyond.

Major funders:

Dundee City Council

EventScotland

Research Councils UK

Scottish Government

The Gannochy Trust

The Courier was media partner.

Financial contributions to support other festival events and marketing were kindly provided by:

BioDundee

Dundee College

Dundee Science Centre

Dundee Waterfront

The James Hutton Institute

Medical Research Council

MRC Protein Phosphorylation Unit

Skills Development Scotland

University of Abertay Dundee

University of Dundee

Dundee Science Festival would not have been possible without the partnership of the following organisations:

Alzheimer's Research UK
Angus Council
BioDundee
Bon Appetit Restaurant
Botanical Society of Scotland
Braes' Restaurant and Bar
Bright Club
brightsolid
British Science Association
Cancer Research UK
Chambers Coffee House
DCA
Dundee Arts Cafe
Dundee Botanic Garden
Dundee College
Dundee Heritage Trust
Dundee International Women's Centre
Dundee Literary Festival
Dundee Naturalists' Society
Dundee Science Centre
Dundee Waterfront
Harbour Cafe, Tayport
McIntyres
Medical Research Council
Mills Observatory
MRC Protein Phosphorylation Unit
NEoN
NHS Tayside
Overgate
Perth and Kinross Council
Scottish Dance Theatre
Skills Development Scotland
smallpetitklein
Superfly
TechFest-SetPoint
The James Hutton Institute
The McManus: Dundee's Art Gallery and Museum
The Portcullis Bar, Arbroath
University of Abertay Dundee
University of Dundee
University of St Andrews
Wharton Science

Aims and ethos

Dundee Science Festival aims to:

- celebrate Dundee as a city of science and innovation
- raise local pride in the city
- enhance Dundee's national and international profile as a city of scientific discovery
- establish science as an aspect of culture, alongside arts and heritage

In addition to these values, Dundee Science Festival supports the Scottish Government's Science and Engineering 21 action plan and Curriculum for Excellence.

Dundee is a city of scientific research, discovery and innovation, and through the formation of the Dundee Science Festival initiative, Dundee Science Centre has created a forum and network for partnership working between organisations across the region.

Dundee Science Festival is operated by Dundee Science Centre, as a key strategic initiative in support of its mission. Dundee Science Centre is HMIE-inspected and a registered charity with a remit for education and lifelong learning.

Dundee Science Centre's mission is to be a community resource, which:

- provides a high quality, inspiring social venue for learning for the whole community
- contributes to the development of a culture of engagement with science, and promotes science as an aspect of local culture
- engages the wider community with Dundee's science research community, raising local pride in local discovery
- raises the profile of Dundee as a city of science and scientific discovery
- supports the formal 3-18 curriculum
- is an efficient, responsible and trusted organisation

"Dundee is a city of science and a home to a number of the world's leading scientists. Dundee Science Festival will give the city a well-earned celebration of science, inspiring the scientists of tomorrow, and showing that the city is a great place to both work and play in science, with great science leisure and lifelong learning opportunities"

Professor Sir Philip Cohen, Patron of Dundee Science Festival

Programme content

This year's programme offered our most diverse range of events yet, with science engagement events for all ages and backgrounds, linking science with arts, heritage, dance and even comedy.

Events to engage the youngest budding scientists:

- During the **Early Explorers** event at Dundee Science Centre, the science centre was dedicated to children aged 3-5 years, with hands-on and inspiring activities to nurture their inquiring minds

Events to excite primary school pupils:

- **Dundee Science Festival's Primary Programme** ran in schools throughout the city. Through workshops, demonstrations and activities primary children learnt about many different aspects of science, supporting Curriculum for Excellence

Events to capture the imagination of young people at school:

- **How do you make a robot dance?** challenged pupils to program a robot and teach it how to dance

Events for adults- showing that science can be part of culture:

- **Cafe Philsophie de Science** allowed visitors to discuss topical science issues and learn more about the philosophical perspective
- **Robin Ince** and **Helen Keen** offered a lighter side to science at their comedy nights, whilst **Bright Club** showcased local science comedy talent

Events to engage the public with new technologies:

- **Dundee's Digital Discoveries** QR code trail featured bright and colourful QR code posters across Dundee city to create intrigue and curiosity

Events that engaged the community with current research:

- **College of Life Sciences Open Day** allowed members of the public to get behind the scenes of the University of Dundee and meet researchers and scientists at the forefront of local research
- **Family Fun Days at Dundee Science Centre** engaged visitors with local researchers through hands-on activities and demonstrations

Events for the whole family to learn and have fun together:

- **Biodiversity Roadshows** took activities out to two of the city's community centres for a fun, interactive evening exploring nature

Events that linked science with our city's heritage:

- **Archive tours at the University of Dundee and McManus Collections Unit** let visitors explore the wealth of information and resources that is held in the city

Events to support professionals:

- **Facilitating Science Discussions** and **Introduction to Science Communication** provided development for a range of professions and the opportunity to share ideas with colleagues

Venues across the city centre and suburbs included:

- Dundee Science Centre
- RRS Discovery
- The McManus: Dundee's Art gallery and Museum
- Various venues across the University of Dundee
- Abertay University
- McIntyre's Hairdressers
- Dundee Rep Theatre
- Primary and secondary schools across Dundee
- Menzieshill and Kirkton community centres
- Dundee International Women's Centre
- Ninewells Hospital
- The Portcullis Bar, Arbroath
- Harbour Cafe, Tayport
- The Hannah MacLure Centre
- Bon Appetit Restaurant
- Braes' bar
- Chamber's Coffee House
- DCA
- Overgate shopping centre
- Meadowside Counting House, DC Thomson
- Dundee International Women's Centre
- brightsolid HQ

Awareness raising

One of the key priorities for the Dundee Science Festival 2011 leadership team was to enhance awareness of the festival and the diverse range of events and partners. The festival exists not only to deliver a flagship annual event, but to raise the profile of all partners' learning provision all year round.

A high level of awareness was achieved, through creative use of media and by targeted distribution of promotional material.

A VIP media launch promoted the festival one month ahead of the start date, with speeches led by Professor Chantler, and attendance by senior leaders of stakeholder organisations from across the city. This was coupled with distribution of the 24-page festival programme to every primary and secondary school pupil in the greater Dundee area, as well as to all community centres, libraries and key public pick-up points in Dundee, Perth, Aberdeen, St Andrews and Stirling. At the same time, the website was launched as an intuitive and fully-informative site. Print also encompassed pop-up stands for use at events, and posters and billboards with a street presence in both Dundee and Perth. Working in partnership with local businesses, 8'x 4' banners were sited alongside key link routes in to the city and at high visibility sites in and around the city centre.

Advertising was taken in local press and select publications as well as local radio advertising. A full PR programme was prepared and local newspaper, The Courier, committed to the festival by becoming media partner, ensuring a high level of continuous press coverage prior to and throughout the festival. Dundee Science Festival received coverage from two local television stations - STV and the local digital Dundee Channel - as well as BBC Radio Scotland and national press.

Photography was commissioned and directed to enable a bank of images to be created – not only as a record of events, but also for future use in related promotions. Success was certainly achieved in that Dundee Science Festival was not perceived to be a specialist, niche festival that just happened to be hosted in the city; rather, it was very well recognised, and embraced by the community as a city-wide (and beyond) celebration of everything that is science.

"We're happy to be associated with the Dundee Science Festival for the valuable work it does in promoting the world of science to a wide audience, and making the subject interesting and relevant to people in all walks of life"

Andrew Argo, The Courier

Audience

In the festival's second year of operating a broad programme incorporating family, adult, early years and school strands, Dundee Science Festival reached a wide audience totalling 10,063, a 14% increase from 2010's audience.

Of these visitors, the majority (68%) came from within Dundee itself; those who were from outwith Dundee city were predominantly from neighbouring Angus, North Fife and Perth and Kinross.

Most people had heard about events via word of mouth and the second most popular method of hearing about Dundee Science Festival was through the festival brochure. However the website, radio and press coverage were also effective.

Attendance at individual events can be found in the final section of this report. Below are overall audience figures.

Children:	6,518 (of which over 4,800 as school pupils)
Adults:	3,545
Total:	10,063

Note: Where events were not ticketed, some visitor numbers are close estimations based on observation.

Dundee Science Festival's programme also incorporated NEdN digital arts festival and Dundee Literary Festival. However visitor numbers for either of these festivals is not included in DSF visitor numbers.



Clockwise from top left: Family Fun Day at Dundee Science Centre, 'How do you make a robot dance?' workshop at Braeview Academy; 'It is Rocket Science' at University of Dundee, and Secrets of Spice workshop at Dundee International Women's Centre .

Economic impact

Dundee Science Festival took place due to the support of its funders and the commitment and enthusiasm of the many partners.

Funders

The budget supporting overall festival marketing and support for other events was managed and administered by Dundee Science Centre, with the support of Dundee Science Centre Board of Directors, representing University of Abertay Dundee, University of Dundee, Dundee College, Cyclacel, Dundee City Council, James Hutton Institute, brightsolid, and others.

A wide range of partners kindly contributed to this budget:

Partner	Contribution
Scottish Government	£15,000
Research Council UK	£12,000
Dundee City Council	£10,000
Gannochy Trust	£10,000
Event Scotland	£5,000
University of Dundee	£2,000
Skills Development Scotland	£2,000
Dundee Science Centre	£1,000
Dundee College	£1,000
Dundee Waterfront	£1,000
James Hutton Institute	£1,000
Medical Research Council (Dundee)	£1,000
University of Abertay Dundee	£1,000
BioDundee	£500
Medical Research Council (Central)	£500
Total	£63,000

In-kind funders

The vast majority of partners contributed staff time, venues, organisations, management and marketing of their own events at no or little cost to the festival partnership. This support cannot be underestimated, and it is the enthusiasm and commitment of these partners that enabled Dundee Science Festival to take place.

Across all partners, in-kind support is valued at a minimum of £170,000. Additional in-kind support from local business and organisations towards marketing of the festival is valued at a minimum of £9,000.

Costs

The central festival budget was administered in order to support partners in need of financial assistance to hold events, and to manage central functions such as coordination, evaluation, PR and marketing.

As chair and leader of the festival partnership, contribution by Dundee Science Centre is valued at £9440.

All partners were invited to request funds from the central budget where their events may not otherwise be able to take place.

Function	Recipient partner	Cost
Festival programme launch event, September 2011	Dundee Science Centre	£1,000.00
Management and coordination	Dundee Science Centre	£9,440.00
Brochure: design, print and distribution	Local and national- based design, print and distribution companies contracted by Dundee Science Centre	£9,682.88
Press and Publications Advertising	The Courier and local and national media contracted by Dundee Science Centre	£1,569.76
Poster and Banner Campaign	Local and national-based design, print and advertising companies contracted by Dundee Science Centre	£4,489.30
Radio Advertising	Local radio station contracted by Dundee Science Centre	£1,598.34
Photography	Local-based photography company contracted by Dundee Science Centre	£400.00
Website design and hosting fee	Local-based web development contracted by Dundee Science Centre	£1,866.67
PR	Local-based PR company contracted by Dundee Science Centre	£2,000.00
Evaluation	Dundee Science Centre	£1,000.00
Total support for partner events	(breakdown of costs on following page)	£29,951.56
Total		£62,998.51

Staffing

Over a minimum of 300 people were involved in running Dundee Science Festival's events.

Most were paid staff members, with their time committed as in-kind support by the many partner organisations.

Breakdown of financial support for events from central budget:

Events	Recipient partner	Cost
Contribution to British Science Association lecture	British Science Association	£276.97
Contribution to British Science Association lecture	Revealing Research	£120.00
Contribution to Café Science Extra	Dundee Science Centre	£250.00
Contribution to Eggheads	University of Abertay Dundee	£100.00
Contribution to Exercise is Medicine	Ninewells Hospital – Department of Orthopaedic & Trauma Surgery	£200.00
Contribution to Extreme Dance	Scottish Dance Theatre	£600.00
Contribution to Family fun days	Dundee Science Centre	£2,800.00
Contribution to Family fun days stand	University of St Andrews: School of Maths and Statistics	£129.00
Contribution to Helen Keen: Woman of the future!	University of Dundee Museum	£467.00
Contribution to Hollywood Holidays, Paradise Lost	Revealing Research	£205.86
Contribution to How do you make a robot dance?	University of Dundee: School of Computing	£60.00
Contribution to It is Rocket Science	Wharton Science	£245.50
Contribution to It is Rocket Science	Revealing Research	£15.00
Contribution to Make your own zoetrope	DCA	£200.00
Contribution to Primary School Programme	Techfest-Setpoint	£12,000.00
Contribution to RCUK dialogue events podcasting	Dundee Channel	£800.00
Contribution to RCUK Digital Discoveries poster campaign	Local and national- based design and advertising companies, and Dundee Science Centre	£3,245.00
Contribution to RCUK Digital Economy dialogue events	Dundee Science Centre, Revealing Research and scientific researchers involved in events	£5,455.00
Contribution to Robin Ince Happiness through Science	Warin McCarthy (Robin Ince Management) and local hotel, bar and security companies	£1,833.00
Contribution to Science Discovery day	Dundee Heritage Trust	£150.00
Contribution to Secrets of Spice	Dundee International Women's Centre	£170.00
Contribution to Victorian zoetropes in the classroom	DCA	£100.00
Contribution to Well Good	Smallpetitklein	£300.00
Contribution to What can you do with a computer?	University of Dundee: School of Computing	£60.00
Contribution to Zombie Science	Dundee Literary Festival	£169.23
	Total	£29,951.56

Evaluation and Impact

Methodology

To assess visitor learning outcomes, a national format created by the Association of Science and Discovery Centres was used across all adult and family events, in order to provide assessment of individual events as well as an overall view of outcomes. Allocating a numeric value to responses (1-5, as below) allows averages to be acquired, and the mapping of outcomes against the Generic Learning Outcomes.

	Strongly agree (=1)	Agree (=2)	Neither agree nor disagree (=3)	Disagree (=4)	Strongly disagree (=5)
<i>I enjoyed this event</i>					
<i>I learned something new</i>					
<i>I feel that science is more interesting than I did before this event</i>					
<i>This event has made me want to find out more about science</i>					
<i>This event has made me feel that science is relevant to my life</i>					
<i>I feel today has made me a little more confident about approaching science in the future</i>					
<i>I would recommend Dundee Science Festival to others</i>					
<i>I would trust science festivals to portray science more honestly than the media or government</i>					



This format was accompanied by free-text questions to assess impressions of the best aspect of the event and what could be improved. Together, these formed the Dundee Science Festival evaluation forms, which were completed by hand at the event in question. This evaluation tool was applied by the partner organisation managing the event and analysed by Dundee Science Centre. This was used at the majority, but not all events. A separate tool was used for the school programmes and reflected in the analysis below.

Impact on visitors

Outcomes show that enjoyment was the highest scoring outcome across the whole festival, with high enjoyment in all events, resulting in a high average outcome of 1.31 (mean average based on a Likert scale of 1 to 5 in which 1 = strongly agree and 5 = strongly disagree). This led to many 'strongly agreeing' that they are likely to recommend Dundee Science Festival events to others (average 1.39).

Similarly high-scoring was the statement, 'I learned something new' (1.46). This combination of most significant outcomes implies that festival visitors experienced enjoyment hand-in-hand with learning, felt that they had learned something, and felt sufficiently positively about the experience that they would recommend it to others.

This very powerful combination is coupled with a feeling of trust in the integrity of information presented at science festivals (1.66).

Whilst these were the highest scoring outcomes, all statements received very positive feedback, with all outcomes scoring between 1.3 and 2.3 meaning the majority of visitors polled either agreed or strongly agreed with the statements below. The statement 'I feel that science is more interesting than I did before' received the lowest average score at 2.24. This may be due to the fact that those choosing to attend a science festival event already had some interest in science-related topics.

Overall whole-festival average scores were as follows:

Statement	Average score across the festival (in which 1=strongly agree and 5=strongly disagree)
<i>"I enjoyed this event"</i>	1.31
<i>"I learned something new"</i>	1.46
<i>"I feel that science is more interesting than I did before this event"</i>	2.24
<i>"This event has made me want to find out more about science"</i>	2.16
<i>"This event has made me feel that science is relevant to my life"</i>	1.92
<i>"I feel today has made me a little more confident about approaching science in the future"</i>	2.14
<i>"I would recommend Dundee Science Festival to others"</i>	1.39
<i>"I would trust science festivals to portray science more honestly than the media or government"</i>	1.66

Impact on partner organisations

Positive outcomes were also evident for organisers and festival partners. Some venues and partners mentioned that they felt involvement in the festival enabled them to broaden their audience, attracting new people to their venues or events. Other partners have commented that through financial support available through the festival partnership, they have been able to hold events that they otherwise would not have been able to hold.

“We are delighted to have been part of Dundee Science Festival. Staff feel they have benefited from being involved in the initial planning meetings and have enjoyed the 'buzz' generated by the Festival. Our activities have benefited significantly from the Festival's great marketing and publicity - the impact of this was particularly evident at our Family Fun Night held at Mills Observatory”

Christine Millar, Leisure and Culture Dundee

Individual event evaluation

Below is a breakdown of impact by event, where evaluation forms were completed.

Dundee Science Festival Primary Programme Monday 31st October – Friday 4th November Schools

Building on last year's Dundee Science Festival Primary Programme, this year's very successful programme delivered by Techfest-Setpoint offered a varied programme of workshops (in both schools and partner venues) for schools across Dundee and surrounding areas. Workshops included 'Sparks will fly', which explored the basic principles of chemistry; 'How to build a lighthouse', which taught pupils how to use scientific principles to build a lighthouse that would stand the test of time; and 'All at Sea', which explored how science is used at sea, and how scientific techniques are used to help learn more about our polar regions.

Whilst workshops available to schools were very varied, consistent amongst all of them was the overwhelmingly positive feedback received.

The primary programme engaged a total of 3,234 pupils and 224 teachers.

Comments from teachers included:

- *'My class came away buzzing, looking forward to sharing their information at home'*
- *'...this way of presenting science would encourage children to take ownership for their learning'*
- *'The children enjoyed the activity immensely'*
- *'Children were fascinated - they couldn't contain themselves from asking questions constantly'*
- *'I'd definitely recommend this workshop to others'*

Comments from pupils included:

- *'The best day ever in school'*
- *'It was something new that we hadn't tried before'*
- *'It was fun because we got to try experiments and take part'*
- *'We got to build a car that was powered by a solar battery instead of just listening about it'*



Dundee Science Centre- Science Learning Programme Various dates throughout the festival

Through various workshops in both the science centre and in schools, Dundee Science Centre engaged 656 school pupils and over 60 undergraduates throughout the festival period. Workshops included 'How to be a scientist', where pupils could develop their curiosity through experiments; 'Healthy Body Bits', all about what organs are inside the body; and 'Genes in a bottle', which explores what DNA is and how it shapes who we are. Sessions with Primary Education undergraduates gave University of Dundee students the opportunity to learn more about the resources that can be provided by Dundee Science Centre to support their lessons.

Feedback was very positive from both teachers and pupils. Teacher comments included:

- *“really liked the pace of the practical lesson”*
- *“the session was fun and catered for all levels”*
- *“The activity was very interactive”*
- *“The children loved wearing the lab coats!”*



Victorian Zoetropes in Action: Early Animation in the Classroom **Monday 7th November – Friday 11th November**

‘Victorian Zoetropes in Action’ was a workshop for upper primary school pupils, all about animation, early cinema and how the eye interprets moving images. The first schools outreach programme that Dundee Science Festival has delivered with DCA, the workshops proved very popular with local primary schools and reached over 100 school pupils.

How do you make a robot dance? **Various dates throughout the festival**

Returning for another successful run at Dundee Science Festival, ‘How do you make a robot dance?’ allowed school pupils to learn more about computer programming, design and construction through a fun, highly interactive workshop. The workshop ran in primary and secondary schools, both within Dundee and in Perth and Kinross, reaching over 440 pupils. Feedback from pupils and teachers was very positive, with some teachers remarking upon how the workshop managed to engage pupils who had previously shown little interest in science-related topics.

Comments from pupils included:

- *“I enjoyed learning about new advances in technology”*
- *“It was great to learn about something that is advancing so quickly”*
- *“I had great fun!”*

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding

Exercise is Medicine **Saturday 29th October** **Families**

‘Exercise is Medicine’, an event coordinated by the Department of Orthopaedic and Trauma Surgery based in Ninewells Hospital, was a hands-on interactive exhibition all about physiology and the biomechanics behind sport. The event received 80 visitors, most of whom were from Dundee and most had heard about the event either through the web or via an internal university email. Feedback was overwhelmingly positive with every respondent

feeling they had 'learnt something new'. Other outcomes that scored most highly were enjoyment (average 1.14) and the feeling that the event had made visitors feel that science was relevant to their lives (average 1.34).

When asked what the best aspect of the event was, most visitors mentioned the machines and technologies that were exhibited, although other comments included the "opportunity to meet the experts" and even that "we need to have these [events] in every city!".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Activity Behaviour and Progression

Zombie Science 1Z Saturday 29th October

A first for Dundee Science Festival and the festival's first formal link with Dundee Literary Festival, Dr Austin's 'Zombie Science 1Z' show was a spoof lecture intended to analyse the science behind the fiction. There were two showings of the lecture, which were attended by 190 people in total; one aimed at over 13s and one aimed at over 18s. There was a lot of interest in 'Zombie Science' ahead of the festival, resulting in events full to capacity and very positive feedback.

Of those polled, half of attendees were from Dundee and half had travelled into Dundee from surrounding areas specifically for the event. Most had heard about the event either via word of mouth, the web or the Dundee Science Festival brochure. Observation of the audience suggested that enjoyment was amongst the highest scoring outcomes (corroborated by feedback showing an average score of 1.1) however there was also a strong sense amongst visitors that they had 'learnt something new' (average 1.3) and that on attending the event they were likely to recommend Dundee Science Festival to others (average 1.3). When asked what the best aspect of the lecture was, comments included: "entertaining presenter who was very clearly knowledgeable", "enjoyed the interactivity and liveliness of presenter" and that simply "comedy + science = win".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Activity Behaviour and Progression

Family Fun Day at Dundee Science Centre Sunday 30th October and Sunday 13th November

Due to the success of similar events in 2010, there were two family fun days held at Dundee Science Centre as part of Dundee Science Festival, both offering free admission to all.

As well as the entire exhibition being open and free to explore to visitors, there were also visiting researchers from the University of Dundee and University of St Andrews who were demonstrating various experiments and interactive hands-on activities. There were also stands from the Energy Saving Trust and the TOTeM (Tales of things and electronic memory) project for visitors to explore. Visitors were very engaged in the activities, and the event received very positive feedback from visitors and researchers alike. The days proved

popular with families from both Dundee and surrounding regions and attracted over 1000 visitors (323 on the first day, 730 on the second).

Highest scoring outcomes included enjoyment (average 1.21), the feeling that visitors learned something new (average 1.28) and the feeling that visitors would recommend Dundee Science Festival to others (average 1.07). The vast majority of visitors claimed the best aspect of the event was that it was free of charge, although other comments included that the event provided “fun for adults and children”, with a “variety of activities and interactive demonstrations” and “I enjoyed all of it!”. There were also a number of comments from parents who enjoyed seeing their children learning about science. “[the best part was] seeing my son interact with the researchers” and “I enjoyed watching my child’s face light up as they watched the experiments”.

Most significant learning outcomes:

- Knowledge and Understanding
- Enjoyment, Inspiration and Creativity
- Activity, Behaviour and Progression



Make your own Zoetrope Sunday 30th October

To complement a similar event that was held for schools, DCA’s ‘Make your own Zoetrope’ workshop demonstrated how easy it is to make your own animation, using very simple technology that can be recreated at home. The event was well received and was fully booked with families (making 16 visitors in total) from the local area. Feedback was positive from both families and organisers alike, with many enjoying the fun, hands on activities.

Cafe Science Dundee Monday 31st October

Part of the Cafe Science Dundee series that runs all year round, this particular event centred around crime scene investigation and local forensic research. Although the talk was part of a series of events, the talk attracted an audience of 55 adults, with a balance of regular attendees and newcomers. Most were from in or around Dundee and were most likely to have heard about the event either through word of mouth or via the local newspaper.

The interesting topic and thought-provoking talk, covering the history of fingerprint detection as well as recent advancements in forensic technology sparked a lively question and answer session, which engaged and challenged the audience, reflecting in very positive feedback. The highest scoring outcomes were for enjoyment (average 1.3) and the likelihood of a visitor recommending the festival to others (average 1.2). Visitors were less likely to feel that attending the event would make them more confident to approach science in the future (average 2.3), however this is most likely due to the fact that those attending may have been already interested in science and already felt suitably confident about approaching science.

Many visitors commented on the informal, relaxed atmosphere and the interactivity of the talk along with the interesting speaker as their favourite aspects of the event.

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Activity, Behaviour and Progression

Early Explorers Tuesday 1st November

Dundee Science Centre's Early Explorers (a science themed activity day for children aged 3-5 years) focused on 'Dundee's Discoveries', featuring activities all about exploring and Dundee's past.

All visitors (30 children and 30 adults in total over two sessions) had come from within Dundee and were most likely to have heard about the event through the festival brochure or via word of mouth. The most highly scoring outcomes were the likelihood of recommending the festival to others, enjoyment, and trust that science festivals portray science more honestly than government or media (scoring averages of 1.0, 1.14 and 1.42 respectively). Written feedback was just as positive, with visitors commenting that the activities were "very age appropriate" as well as being "well managed by staff who were very good with the kids".

Most significant learning outcomes:

- Attitudes and Values
- Enjoyment, Inspiration and Creativity
- Activity, Behaviour and Progression

Mending the Broken Heart: The evolution of cardiology in Tayside Tuesday 1st November

Due to the interest in last year's lecture held by the Tayside Medical History Museum, another was scheduled for Dundee Science Festival 2011, this time highlighting the advances in cardiology that have taken place in Tayside. The event was well attended with 48 visitors, a 100% increase from audience figures in 2010. The vast majority of visitors were from within Dundee and were most likely to have heard about the event either through an internal email (either NHS Tayside or University of Dundee), through the web, or via newspaper.

The highest scoring outcomes amongst visitors were enjoyment (average 1.18), the feeling that they had learnt something new (average 1.09) and the feeling that they would trust science festivals to portray science more honestly than government or media (average 1.47). Visitors were less likely to feel that this event had made them want to learn more about science (average 2.26) however this is likely to be because they already had a keen interest in science and were already likely to attend such an event.

Visitors were most likely to cite either the speakers or the topic as the 'best thing' about the event, with positive comments including: "well pitched", "extremely interesting" and "very relevant".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Attitudes and Values

H.G Wells and Cinema- Turning Science Fiction into Science Fact Tuesday 1st November

Following the success of the Arts Cafe talk during Dundee Science Festival 2010, a similar Dundee Art's Cafe event based on the work of H.G Wells was scheduled for 2011. The

event attracted 50 visitors, with the majority of visitors aged between 21-25 (around 16 visitors) or over 45 (around 18 visitors) and the majority of visitors had never visited an Arts Cafe event before.

All visitors who were polled had travelled from within Dundee and were most likely to hear about the event either through word of mouth or through the festival brochure. Highest scoring learning outcomes were enjoyment (average 1.4) and the likelihood of recommending the festival based upon their attendance (average 1.5). Visitors were less likely to feel that attending the event would make them feel more confident about approaching science (average 2.4) however this is likely to be due to the event being more arts themed and not overtly 'science' themed. Comments from the audience included: "a very interesting discussion", "I enjoyed learning the relevance of H.G Wells' work today" and "I enjoyed the speaker's style".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Activity, Behaviour and Progression

The Science behind Hair Tuesday 1st November

A collaboration with McIntyre's hairdressers (a new festival partner for 2011), this event sought to teach members of the public about the more scientific side to hairdressing. Whilst the event was not as highly attended as initially hoped, the smaller visitor numbers (4 people in total) allowed for greater levels of engagement and interaction between the presenters and audience.

All visitors were from Dundee and were most likely to hear about the event through word of mouth or via Twitter or Facebook. Highest scoring outcomes were enjoyment (average 1.28), the feeling that they had learnt something new (with all attendees strongly agreeing with the statement) and the feeling that they would trust science festivals more than government or media to portray science more honestly. Written feedback was very positive too, with comments including "[it was] well presented with easy to understand narration" and "[it was] very informative and interactive".

Most significant learning outcomes:

- Knowledge and Understanding
- Enjoyment, Inspiration and Creativity
- Attitudes and Values

What can you do with a computer? Wednesday 2nd November

'What can you do with a computer?' allowed school groups and the public unique access into the University of Dundee's School of Computing, to learn more about the research they conduct and have the opportunity to have a tour of their facilities. The event had 47 visitors (30 of which were school pupils) with the majority travelling from within Dundee, although some school pupils had travelled from Perth. Enjoyment and the feeling that visitors had 'learnt something new' scored most highly as outcomes (scoring 1.7 and 1.5 respectively). The evening tours proved particularly popular with families and feedback was very positive. People appeared to enjoy the interaction with undergraduates and hearing more about their

projects and research interests; other comments included enjoying an “insight into the practicality of IT” and “learning new things”.

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding

The Scalp Clinic Wednesday 2nd November

The second event held by McIntyre’s hairdressers for the festival programme, ‘The Scalp Clinic’ allowed visitors to gain insights into how healthy their crowning glory really is. Visitors were asked to bring along details of their diet and any ailments they have, which along with their scalp analysis technology could form a diagnosis and offer suggestions on how best to look after their hair. ‘The Scalp Clinic’ received interest from members of the public who were keen to learn more about the health of their hair, resulting in 4 people booking in for the procedure and with positive feedback from visitors and organisers alike.

The Power of Social Media Wednesday 2nd November

Delivered in partnership with Revealing Research and the RCUK Digital Economy Programme, ‘The Power of Social Media’ was an event designed to informally discuss the topic of social media and the issues surrounding its use. The event was held in a similar format to the very popular ‘Cafe Science’ series that has been running in Dundee since 2008, and attracted 26 visitors, of whom roughly three were aged under 20, thirteen were aged 21-35, five were aged 36-44 and an additional five were aged 45 and over.

The talk discussed the effect of social media on both formal and informal interactions with politics, with reference made to the electorate’s voting behaviour and participation in elections, to more ad hoc interaction like protesting and rioting. As could be expected with such a current and contentious subject, the talk was followed by a lively discussion which touched on a wide variety of topics. Topics raised included the possibility of voting online, the effect of social media on recent UK and worldwide elections, the power of social media in local politics as well as how social media can be used to mobilise the next generation of voters. There were also interesting points made about the potential uses of social media, including how Twitter and Facebook can be used in emergency situations, as a means to both provide and collate information. There were however concerns raised about potential security issues with social media; this led to members of the audience sharing their experiences of participating in politics online (such as filling out the census online) to reassure others.

The majority of attendees had never previously attended a ‘Cafe Science’ event, which suggests that the title of the event and the topic itself helped to engage an audience who perhaps had not considered attending a more overtly ‘science’ themed discussion before. Anecdotal feedback and observation of the event suggests that the many attendees were students or were professionals in related subject areas, with many taking notes and staying behind to ask questions of the speaker.

Secrets of Spice Wednesday 2nd and Wednesday 9th November

Another new addition to the Dundee Science Festival Partnership for 2011, Dundee International Women's Centre held two 'Secrets of Spice' workshops during the festival, which sought to teach women about the health benefits in the spices behind the humble curry.

Both workshops were very well attended (with 22 visitors in total, the first full to capacity) with women who lived in Dundee and had most likely heard about the event through local newspaper coverage or word of mouth.

Feedback was very positive with outcomes in enjoyment (average 1.1), the feeling that they had learnt something new (average 1.25), and the likelihood of a visitor recommending the festival (average 1.25) all scoring most highly. Feedback from attendees included "very interesting- encouraged me to find out more" and "[the best thing was] the people and their relevant knowledge".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Activity, Behaviour and Progression



Dundee Science Eggheads: The Final Wednesday 2nd November

Organised by University of Abertay Dundee, and Angus, Dundee and Perth and Kinross Councils, 'Dundee Science Eggheads: The Final' pitted teams of upper secondary school pupils against five local professors (from scientific disciplines) in a fun, light-hearted evening, testing their knowledge of science, culture and general knowledge. The majority of attendees were from Dundee, although some had travelled from Angus and Perth and Kinross to support their friends or family taking part. Most had heard about the event through word of mouth or via the local press, although many had heard about the event because they knew someone taking part.

The event was well-attended with over 120 visitors and feedback about all aspects of the event was excellent. As could be expected at a gameshow-type event, enjoyment was the highest scoring outcome (average 1.3), although many also felt they had learnt something new (average 1.67). Written feedback was also very positive with comments including: "well presented, well played and well organised", "educational, entertaining, light-hearted" and "the opportunity to see the fun in science!".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding

Recording the Past, Present and Future: Science in the University Archives Thursday 3rd and Thursday 10th November

'Recording the Past, Present and Future...' allowed members of the public the unique opportunity to take a guided tour around the University of Dundee's archives.

After looking around the archives, visitors could then look around a selection of archive materials that had been specifically chosen for their relevance to science. These ranged from nuclear emergency planning documents from the 1960s to patient lists of local hospitals in the late 1800s. The audience (of 14 in total over the two events) was varied, with approximately most aged over 45 and the remainder aged between 16-24. When asked what the best aspect of the event was many people cited the archives themselves, although some mentioned the “openness and knowledge of the staff” and “seeing the wealth of information” as their favourite aspect.

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding

The Science behind the Internet Thursday 3rd November

A new partner for 2011, **brightsolid** (a Dundee-based company specialising in online technologies) held their first festival event – providing personalised tours around their data centre, for public and higher education pupils.

Most visitors had travelled to the event from within Dundee, although around a quarter of those polled were from outwith the city and were most likely to have heard about the event via word of mouth or via their education institution (many visitors were students of computing or computer science). Feedback was very positive with the feeling that they had learnt something new (average 1.25), that science was relevant to their lives following the event (average 1.76) and that science festivals portrayed science more honestly than government or media (average 1.5) amongst the highest scoring outcomes. When asked the ‘best thing’ about the event, many cited the opportunity to “meet people who work in the industry” as well as the chance to “gain an insight into **brightsolid**” or “being able to see the inner workings of an Internet Service Provider”. If anything, respondents claimed that “having more time” would have improved the event.

Most significant learning outcomes:

- Knowledge and Understanding
- Attitudes and Values

Open Laboratory Session Thursday 3rd and Saturday 5th November

For this event, University of Dundee’s Physics department opened its doors to the public to showcase their research and to teach visitors more about how physics affects the world around us. Both the evening and afternoon sessions were well attended (with approximately 50 visitors), mainly by families with younger children who lived in the Dundee area. Anecdotal evidence showed a high level of engagement with the scientific experiments, particularly the adapted Wii games console, which demonstrated how games technology can be utilised in other disciplines. Visitors also very much enjoyed learning about optical tweezers and how lasers are being used to advance various areas of scientific research.

Food Supply in a Changing World Thursday 3rd November

The lecture was well attended, with around 90 visitors, who had predominantly heard about the event through either the festival brochure, website or via word of mouth. With the world's growing population a very current issue, audience feedback about the event centred around how relevant and interesting the topic was: "an excellent speaker and a very interesting topic", "a global topic with local context" and "an interesting lecture with information that affects us all". Enjoyment, the feeling that they had learnt something new, as well as the likelihood of recommending Dundee Science Festival were amongst the highest scoring outcomes (average 1.4, 1.5 and 1.5 respectively). Visitors were less likely to agree that attending the event would make them feel that science was more interesting than before (average 2.5) as those who attended were likely to already have a keen interest in science and science-related topics.

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Activity, Behaviour and Progression

It's all in the mind... Thursday 3rd November

The first and only psychology-themed event at Dundee Science Festival to date, University of Abertay Dundee used demonstrations and real-life examples to look at how memory works.

The event attracted 30 visitors, the majority of whom were from Dundee and had heard about the event via the university (as they were students at University of Abertay Dundee), through the festival brochure or through word of mouth. The lecture was very interactive, with memory tests and psychology experiments throughout- many visitors cited these as their favourite aspect of the event: "effective demonstrations" and "the interactive elements were really fun" were just some of the positive comments received, while one visitor described the subject matter and demonstrations as simply "astounding". Enjoyment, the feeling that they had 'learnt something new' and that they now felt more likely to trust science festivals to be more honest than government or media were the highest scoring outcomes (average 1.3, 1.3 and 1.5 respectively). Although visitors were less likely to feel as though the event had made them more confident to approach science in the future (average 2.08) this was most likely due to the high proportion of science undergraduates in the audience, and the likelihood of the majority of the audience to visit a science-related event already.

Most significant learning outcomes

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Attitudes and Values

It is Rocket Science! Friday 4th November



Delivered by Wharton Science, the science behind Bonfire Night was explored at this family oriented event full of impressive demonstrations and exciting explosions. The event attracted over 120 visitors, the majority of whom were families with young children from in and around Dundee, who had most likely heard about the event through picking up a festival brochure, the website or via word of mouth. The highest scoring outcomes were enjoyment (average 1.1) the

feeling that a visitor had 'learnt something new' (average 1.2) and the feeling that a visitor would recommend Dundee Science Festival (average 1.0 - with all respondents 'strongly agreeing'). The 'best thing' about the event according to the majority of visitors was "the enthusiasm of the presenter" who impressed the audience with experiments that were "lots of fun for adults and children alike".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Activity, Behaviour and Progression

Speed Science- From dot.com to dot.communities Friday 4th November

Schools

Coordinated by Revealing Research in partnership with the RCUK Digital Economy programme, 'Speed Science' saw ten researchers (from dot.rural at University of Aberdeen) visit Arbroath Academy to showcase their research to pupils. In this exciting and fun format, each researcher was positioned at a different station and given just three minutes to explain how their research would benefit rural communities, before pupils would move on to the next station (and researcher).

The event reached 27 upper secondary pupils, who were all from the Arbroath area. The event was a great success, with very positive feedback from both researchers and pupils alike. The format of the event allowed pupils to interact with researchers in a more informal manner and the fast paced nature of the event meant pupils were kept busy, engaged and interested.

Public

To complement the 'Speed Science' event which was held in Arbroath Academy, a similar event was held for adults on a Friday evening, at a local bar. Conducted using the same format, visitors heard from ten different speakers who were discussing their research relating to how digital technologies can benefit rural communities. After hearing from all researchers, the audience was then asked to decide to vote for the winner - who would then give a more detailed presentation of their work.

Whilst the audience was small (7 people), the level of engagement was high with lots of questions being asked of the speakers, initiating lively discussion. A breadth of topics was discussed including the provision of satellite-based internet in rural areas, online security, how dependent on the internet people have become and the design of user interfaces. The audience were predominantly aged 26-34, lived in Arbroath and did not typically attend science-themed discussion events.

Hollywood Holidays or Paradise Lost? Media, Money and the Environmental Impacts of Tourism **Friday 4th November**

Held in partnership with The Hannah MacLure Centre (a new partner for Dundee Science Festival 2011), University of Dundee's 'Hollywood Holidays or Paradise Lost?' event explored the impact of tourist developments on Jamaica's North Coast. One of only a few environmental science themed events in the festival programme, the event featured the showing of the film 'Jamaica for Sale' followed by a discussion that allowed the audience to discuss the themes raised in more detail. Whilst the event received a small audience (of 8 people) the feedback was positive from both the audience and event organisers.

Technology for All **Saturday 5th and 12th November**

Held in a busy city centre shopping centre, 'Technology for all' was an interactive, hands-on event that enabled the public to engage with local cutting-edge digital research. There were four stands at each event, each manned by a local researcher demonstrating their work. The technology exhibited was varied, but all centred around the theme of using technology to improve or assist lives, whether that be to allow those with assisted needs to communicate or to ensure an elderly person is safe in their home.

With such interesting and hands-on exhibits, the event was very busy with interested shoppers curious to learn more. On the first day (5th November) researchers engaged with 169 visitors, however this rose to a much greater audience of 620 visitors on the second day (12th November). Whilst these figures relate to the number of direct engagements, it's also important to note that there were over 50,000 shoppers each day in the centre that would have been made aware Dundee Science Festival's presence. The audience was very varied, reflecting the variety of activities and topics covered by the stands, with young families, teenagers and adults all participating. Whilst the younger visitors could touch and play with the hands-on technologies, older visitors could learn more about sensors and programming, as well as the social impacts of design.

Anecdotal feedback suggests that 'the 'Dolls House' exhibit (a large model house designed with an older adult in mind, with motion sensors, cameras and alarms to ensure their safety and wellbeing) was particularly good at provoking discussion and making people think about these issues.

One particularly memorable visitor was a mother who brought her two sons along to the event, one of whom had assisted-learning needs. Talking about one of the games that was designed by a researcher with autistic children in mind, she remarked that this was the first time her two sons had been able to participate in a game together, and was so happy to see them enjoy playing together for the first time.



Fantastic Fossils **Saturday 5th November**

Following the success of the 'Fantastic Fossils' workshop held at The McManus in 2010, a similar interactive workshop was held as part of Dundee Science Festival 2011. The workshop was fully booked with local families (totalling 16 visitors), who were most likely to have heard about the event through the festival brochure. Following the event the majority of participants stated that they thoroughly enjoyed themselves (average 1.2), felt that they had learnt something new (average 1.2) and that they now felt more confident to approach science in the future (average 1.3). When asked what they most enjoyed about the event, the majority of respondents cited the "knowledge" and "enthusiasm of the staff" however many parents said that they enjoyed the chance to have fun with their children. When asked what could be improved, all respondents said "nothing".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Activity, Behaviour and Progression

Science Discovery Day **Saturday 5th November**

Following the success of last year's 'Science Discovery Day', Dundee Heritage Trust held another science themed activity day for this year's programme, which taught visitors all about the research carried out in Antarctica today as well as how science was used aboard the RRS Discovery. The day proved very popular and attracted over 120 visitors to Discovery Point- a slight decrease in audience numbers received in 2010, however this may have been due to more events being held around the city on the same day. Feedback was positive from visitors and organisers alike, with visitors enjoying the opportunity to learn about science in the Antarctic in a fun, hands-on way.

Baby Sensory **Saturday 5th November**

A very popular element of Dundee Science Centre's science learning programme, 'Baby Sensory' is a way for even the smallest visitors to interact with science. With lots of sensory activity including sign language, fibre optic light shows and massage to maximise and stimulate baby's early development, 'Baby Sensory' provides an enjoyable session for baby and parents alike. Both sessions proved very popular (and were both fully booked) and received great feedback from parents. This led to a very high proportion of visitors rebooking – over two thirds of those who attended Baby Sensory during Dundee Science Festival went on to book a class for the following month.

Cafe Philosophie de Science **Saturday 5th and 12th November**

Bon Appetit, a local restaurant, brought a distinctively French approach to Dundee Science Festival with events that discussed a more philosophical side to science. Despite this being the first time 'Cafe Philosophie' was run by the restaurant and has been featured in the festival programme, both events were fully booked (with around 30 visitors attending each) with diners wishing to learn more about the moral and ethical side to science. Most had

heard about the event through word of mouth, through the festival brochure or by coming across a poster. Enjoyment, the feeling that they were likely to recommend the festival to others and that they had 'learnt something new' were the highest scoring outcomes (average 1.15, 1.3 and 1.5 respectively). Visitor comments included "it was very interesting", "[it was] thought provoking and entertaining" and "it was a fantastic talk". Following the success of Cafe Philosophie de Science, Bon Appetit has informed Dundee Science Festival that they plan to make the talks a more regular occurrence at the restaurant.

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Activity, Behaviour and Progression

Searching your family history online Sunday 6th November

The second of two events coordinated by brightsolid in this year's programme, 'Searching your family history online' was a free of charge event that taught the public about how to research their family tree using online resources. The event garnered a lot of press and online attention prior to the festival, which resulted in large visitor numbers (over 200 visitors) and very positive feedback. The audience was predominantly aged 45- 65, who wished to find out more about how new technologies could help them learn more about their family tree. The drop-in event had different sessions on various aspects of genealogy, including how to access census data, how to utilise the internet in your search and where your search should begin from experts based at brightsolid.

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding

Helen Keen: Robot Woman of the Future Monday 7th and Tuesday 8th November

Following her successful show in 2010, University of Dundee's D'Arcy Thompson Zoology Museum hosted the comedian Helen Keen for two shows this year, showcasing her playful comic style which combines science, comedy and shadow puppetry.

The majority of visitors were from Dundee and had heard about the event through the brochure, the festival website or word of mouth. Enjoyment and the feeling that they had learnt something new were amongst the most significant outcomes (average 1.12 and 1.2 respectively). Feedback was very positive with lots of comments made about the comedian's delivery and her unique brand of science-themed comedy: "silly (in a good way)", "science presented in an approachable way" and simply "good fun" were amongst the many positive comments received on the night.



Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding

Robin Ince: Happiness through Science Monday 7th November

Dundee Science Centre was delighted to host Robin Ince, in what not only was his debut in Dundee Science Festival, but also in Dundee itself. Fresh from his very successful tours across the country, Robin Ince proved a very popular act for the festival, attracting over 80 visitors. Of those polled, half of the audience were local to Dundee, while the remaining half had travelled from surrounding regions especially for the show. Most had heard about the show via word of mouth or social media. Enjoyment was unsurprisingly the highest scoring outcome (average 1.15) closely followed by the likelihood of a visitor recommending the festival following the event (average 1.18). Visitors were less likely to feel that science is more interesting than they did before attending the event (average 2.5), however many visitors noted on their feedback forms that they already had a keen interest in science, or found science an interesting topic. Feedback was very positive with comments including: “an intelligent approach”, “relaxed atmosphere and a very entertaining evening” and “interesting, inspiring and fun”.

Most significant learning outcome:

- Enjoyment, Inspiration and Creativity

Introduction to Science Communication Tuesday 8th November

One of three events in the festival programme which was aimed at teachers and educators, ‘Introduction to Science Communication’ was a two-hour course which trained delegates in basic science communication skills. The Dundee Science Centre: Science Learning Institute course attracted 7 delegates, the majority of whom were from outwith Dundee and had travelled specifically to attend the event, having heard about the event through Dundee Science Centre or Dundee Science Festival’s website. Feedback was overwhelmingly positive with enjoyment, the feeling that participants had ‘learnt something new’ and that they would trust science festivals to more honestly portray science than media or government amongst the highest scoring outcomes (all scoring an average of 1.0). Delegates were also likely to feel that science was relevant in their lives after attending the course (average 1.2) which is very encouraging. Free-text feedback was just as positive, with comments including “[the best thing was] the interaction, relaxed atmosphere, and fun way of learning” and “[it was] very engaging”.

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Attitudes and Values

Science on the Waterfront Tuesday 8th November

Giving members of the public the chance to learn more about Dundee's forthcoming waterfront development, 'Science on the Waterfront' taught visitors about the engineering and technology behind the regeneration of Dundee's Waterfront area. Although the exhibition received fewer visitors than hoped (attracting 8 visitors), those who participated appeared interested and engaged in the exhibits.

Alzheimer's Public Debate Tuesday 8th November

The majority of the audience (70 visitors in total) were from Dundee and had heard about the event, which was organised by Alzheimer's Research UK, through seeing a poster or by picking up a festival brochure. The audience was very varied with medical students, carers, dementia patients as well as the general public. As it is a particularly emotive subject for many, the talks from healthcare professionals led to some very interesting discussion with the audience, many of whom had a direct experience with dementia, either personally, or through caring for someone with the degenerative disease. Feedback was very positive with visitors commenting that they enjoyed "the audience involvement" and "the enthusiasm of the panel" as well as the "variety of speakers from different backgrounds"; whilst others found "the patient and carer point of views very insightful".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Attitudes and Values
- Activity, Behaviour and Progression

Biodiversity Roadshow Tuesday 8th, Thursday 10th November and Saturday 12th November

Following the popularity of the Forensic Science Roadshows in 2010, Dundee College, The McManus and The James Hutton Institute coordinated a similar event for Dundee Science Festival 2011 which this year focused on the natural world. Attracting over 200 people and held at two out-of-town community centres (Menziesshill and Kirkton) as well as in The McManus, these outreach workshops featured interactive activities for the whole family including skull identification and DNA extraction.

Visitors were most likely to have heard about the event via word of mouth or via the festival brochure. Highest scoring outcomes were enjoyment, the feeling of learning something new and the likelihood of recommending Dundee Science Festival to others (all scoring an average of 1.4). When asked what the best aspect of the event was, most visitors cited specific activities: "my daughter loved seeing her own DNA in a test tube"; although many also enjoyed the "hands-on approach" and the "helpfulness and knowledge of the staff".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Activity, Behaviour and Progression

Darwin and our Native Orchids
Tuesday 8th November

'Darwin and the native Orchids' sought to highlight Darwin's lesser known work in botany and his specific work on orchids. Most attendees were members of Dundee Naturalists' Society, although there were some members of the public who had heard about the event through the festival brochure. The event was well attended (with over 45 visitors), with visitors appearing very engaged, asking questions of the speaker following the talk.

Bright Club
Tuesday 8th November

Another exciting addition to the festival programme for 2011 was the feature of Dundee's inaugural Bright Club: a comedy night featuring local scientists. The event was completely fully booked with over 50 comedy fans, the vast majority of whom had heard about the event via word of mouth. All acts were local researchers who had never performed a stand-up routine before and who had been trained specifically for the night. Great local acts, funny and interesting material and a welcoming atmosphere all made for a very enjoyable event, which received overwhelmingly positive feedback. Enjoyment, the likelihood of recommending Dundee Science Festival to others as well as trusting science festivals to portray science more honestly than government or media all scored most highly as outcomes (average 1.1, 1.05 and 1.31 respectively).

Audience comments included "it was hilarious and a very friendly atmosphere", "[the best thing was] the brilliant atmosphere and funny acts" as well as "scientists are funny!".

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Activity, Behaviour and Progression
- Attitudes and Values

Science in the Stores
Wednesday 9th November

Following the interest in The McManus Collections Unit tours in last year's festival programme, the event returned for this year's programme, giving members of the public (10 visitors in total) the opportunity to go behind the scenes in the museum. Visitors learnt about how the museum's vast collection and how it is kept in optimum condition. The majority of visitors were over 45 and had travelled from within Dundee. With a small group of visitors, there was lots of opportunity to ask questions and learn more about the collection.

The Seventh Annual University of Dundee Culture Day: Place, Space and Time
Wednesday 9th November

An annual fixture of University of Dundee's events calendar, the 'Culture Day' this year explored the topic of 'place, space and time' through a selection of lectures. The event received 25 visitors and was attended mostly by those from Dundee, who had most likely heard about the Culture Day through local press, picking up a brochure or via word of mouth. Enjoyment, the likelihood of recommending the festival after attending the event and the feeling of having learnt something new were the most highly scoring outcomes (average 1.4,

1.2 and 1.4 respectively). When asked about the best aspect of the event, most cited the “variety of speakers” as well as the “range of approaches to the subject”.

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Knowledge and Understanding
- Activity, Behaviour and Progression

Cafe Science Extra: Parkinson’s Disease - Past, Present and Future Wednesday 9th November

This Cafe Science Extra event, delivered in partnership with the Medical Research Council, was very well attended (over 70 visitors), with both regulars and those who had come especially for the discussion on Parkinson’s. Similar to the Alzheimer’s Public Debate, many of those attending had a direct experience of the disease and either worked in healthcare or had Parkinson’s disease themselves. Understandably, this made for a very engaged audience and led to an in-depth discussion with the speaker following the talk, and many attendees staying behind to ask questions directly to the speaker. Event organisers commented that the speaker was adept at answering visitor questions and facilitated the discussion well. When asked what their favourite aspect of the event was, comments included that it was “interesting and informative” and “very interesting”.

20:20 Vision - Designing for a Digital Future Wednesday 9th November

Coordinated by Revealing Research in partnership with RCUK Digital Economy Programme, this Pecha-Kucha style event explored what role creative industries could play in our digital future. Speakers were from a variety of institutions from across the country, including University of Lancaster, Newcastle University and Edinburgh College of Art, and spoke on a diverse range of topics.

The event was well attended, with 48 visitors who were mainly from the Dundee area and were most likely to have heard about the event through the festival brochure. Anecdotal evidence suggests that the event attracted many students from both University of Dundee and Duncan of Jordanstone College of Art and Design: audiences that Dundee Science Festival has had difficulty in reaching previously.

Feedback was generally positive, with enjoyment, the feeling that a visitor would trust science festivals to portray science more honestly than media or government, and the likelihood to recommend Dundee Science Festival to others, being amongst the highest scoring outcomes (average 1.8, 1.7 and 1.54 respectively). Amongst the ‘best things’ about the event were “the wide range of topics covered”, “the fast paced [nature of the event]” as well as the opportunity to “hear presentations from people of different backgrounds”.

The Design and Construction of the Bell Rock Lighthouse: A public lecture by Professor Roland Paxton Wednesday 9th November

Another new addition to the Dundee Science Festival Partnership, the Abertay Historical Society held a lecture to commemorate the bicentenary of the Bell Rock lighthouse - a feat of engineering and one of the seven wonders of the industrial world. The lecture was very

well attended (over 85 visitors) and feedback was positive from visitors and organisers alike. The majority of visitors had travelled to the lecture from within Dundee.

Facilitating Topical Science Discussions Thursday 10th November

This teacher professional development event delivered by Dundee Science Centre: Science Learning Institute received 8 delegates, the majority of whom were from Dundee, and had most likely heard about the course via the festival brochure or through word of mouth. Feedback was very positive with the likelihood of a delegate recommending the festival, the feeling that delegates would be more confident about approaching science in the future and the feeling that they had learnt something new amongst the highest scoring outcomes (average scores of 1.0, 1.16 and 1.16 respectively). Delegates appeared to very much enjoy the opportunity to share ideas with other teachers, with many describing this as the best aspect of the event.

Most significant learning outcomes:

- Activity, Behaviour and Progression
- Attitudes and Values
- Knowledge and Understanding

Stem Cells: A Vision of the Future Thursday 10th November

An exciting collaboration between University of Dundee's School of Medicine, DCA and Dundee Science Festival, the screening of the fascinating documentary 'Stem Cells: A Vision of the Future' proved very popular with both arts and science audiences.

The event was fully booked, with 50 visitors, most of whom had heard about the event through the festival brochure or through the web. The audience was varied, consisting of those who had a background in science, those who had no prior knowledge but were interested in the topic, students, and those affected by conditions that they had heard could be benefitted by stem cell research.

Feedback was very positive from all visitors with enjoyment, the feeling of learning something new and that they would trust a science festival to portray science more honestly than media or government amongst the highest scoring outcomes (average scores of 1.16, 1.16 and 1.17 respectively). People appeared to enjoy "learning about the possibilities for the future" and the fact that the information "wasn't dumbed down". Many also commented on the discussion following the film screening which was "very interesting" and "useful for consolidating the information given in the film".

Most significant learning outcomes:

- Enjoyment, Creativity and Inspiration
- Knowledge and Understanding
- Attitudes and Values

Cafe Science Tayport: Saving the Earth: In your garden, on your farm and on our planet

Thursday 10th November

One of two events that saw Dundee Science Festival's reach spread beyond the city boundary, 'Cafe Science Tayport' was an informal talk delivered by a local scientist on the subject of soil erosion. The talk also covered topics including water quality, farming practices as well as practical demonstrations of root structures and how they are affected by soil erosion.

As it was held at a small and intimate venue, the event was busy with around 16 attendees. The vast majority of the audience were over 45 and had a keen interest in gardening and the environment. Most visitors were from in or around Tayport and were most likely to have heard about the event through the festival brochure or poster. Enjoyment, the likelihood of recommending the festival to others and the feeling of learning something new were amongst the highest scoring outcomes (scoring averages of 1.4, 1.5 and 1.6 respectively). From visitor feedback, people appeared to enjoy how they could watch a scientific talk locally, in an informal manner. Others enjoyed the "simplicity" of the event, and that there was "lots of discussion" on topics including hedgerows, water and forest management.

Most significant learning outcomes:

- Enjoyment, Creativity and Inspiration
- Activity, Behaviour and Progression
- Knowledge and Understanding

Extreme Dance: How do they do it?

Thursday 10th November

An exciting collaboration for the Dundee Science Festival partnership and a unique addition to Dundee Science Festival's programme for 2011, 'Extreme Dance: How do they do it?' in partnership with the Scottish Dance Theatre demonstrated the science behind dance. The event featured a contemporary dance performance followed by a short lecture from a local lecturer specialising in Sports biomechanics, who explained more about the biomechanics of the body and how the dancers were able to perform such impressive moves. The majority of the audience were regular attendees at Scottish Dance Theatre performances and most had not visited a Dundee Science Festival event before. Of the 27 visitors, the majority were from Dundee and were most likely to have heard about the event via word of mouth. The performance was also filmed and streamed live online, broadening the audience further. Enjoyment was the most highly scoring outcome, scoring an average of 1.3. Positive comments included: "[I enjoyed the] scientific slant on dancing" as well as "I enjoyed seeing live examples of the topic discussed".

Most significant learning outcome:

- Enjoyment, Inspiration and Creativity

Family Fun Night at Mills Observatory

Thursday 10th November

Back by popular demand, following the success of last year's event, 'Family Fun Night' at Mills Observatory gave families the opportunity to learn more about the night sky. The evening proved very popular with local families, attracting over 250 visitors from in and

around Dundee (an increase of 67%) from 2010's visitor numbers). Families could take part in a range of drop-in activities including mini planetarium shows, space themed craft activities, and 3D film shows as well as stargazing using the Observatory's telescope. The majority of visitors came from within Dundee and had heard about the event through their children's school. Feedback from both families and organisers was very positive, with event organisers mentioning that they had "benefitted significantly" from the festival's marketing campaign.

Untangling the Web: Empowering older people to discover digital Friday 11th November

Finding ways to engage an older generation with digital technologies was the incentive behind 'Untangling the Web', a panel debate coordinated by Revealing Research, in partnership with the RCUK Digital Economy Programme, to discuss how digital technologies can be made to be more accessible.

The panel consisted of 2 people from the University of Dundee School of Computing SiDE user group as well as 2 researchers from University of Dundee, who each gave a short presentation on their work, whether that be by working with user groups to help develop software, or looking at inheritance and how we can bequeath our digital memories to our loved ones.

Whilst the event had a small audience (of 15) the level of engagement was high, with lots of discussion and questions asked, as well as a few visitors staying behind to talk to the speakers after the event. Having a more intimate audience also allowed people to feel more comfortable sharing their experiences of technology with the group, meaning lots of stories were shared.

As anticipated, all attendees were over 45, and most said they had heard about the event via the festival brochure. All visitors thought that there was sufficient opportunity for audience participation and everyone asked thought that the event covered some important topics. When asked what message they would take away with them from the event, one visitor commented that they "should be bolder and experiment more with my computer" which is encouraging. When asked what the best aspect of the event was, comments included: "hearing other people's point of view", "the interaction" and "the informal style".

College of Life Sciences: Open Doors Day Saturday 12th November

Returning for another year to Dundee Science Festival, the College of Life Sciences Open Doors Day remains a popular event (attracting over 170 visitors), and a great way for members of the public to learn more about the scientific research that is carried out in the University of Dundee. Visitors could take tours around the labs, speak to researchers and try their hand at science experiments. Feedback from event organisers (using slightly different criteria to Dundee Science Festival feedback forms) found that 57% of visitors now saw scientific research in a new light and 68% now appreciated the impact of scientific research in Dundee in a new way.

Well Good: Interactive Dance Experience with smallpetitklein Saturday 12th November

The second dance event in this year's festival programme, 'Well Good' was a science-themed dance workshop which aimed to interpret scientific principles through movement and dance interpretation.

Most visitors were from outwith Dundee and were most likely to have heard about the event through the festival brochure. Enjoyment, the feeling of learning something new and the likelihood of recommending Dundee Science Festival to others were amongst the highest scoring outcomes (scoring average scores of 1.2, 1.4 and 1.4 respectively). Visitors appeared to enjoy the novelty of experiencing a science-themed dance workshop in a science centre environment, and feedback was very positive. Amongst the positive comments received were "[It was] lots of fun, interesting and free!"

Most significant learning outcomes:

- Enjoyment, Inspiration and Creativity
- Activity, Behaviour and Progression
- Knowledge and Understanding

Dundee's Digital Discoveries Throughout the festival

'Dundee's Digital Discoveries' was a festival-long event, coordinated by Dundee Science Centre in partnership with the RCUK Digital Economy Programme, that aimed to engage the people of Dundee with digital discoveries (both past and present) in their city. Ranging from the impact of gaming technology, through the advancement in ATM design to how technology is shaping the arts, information on ten different topics relating to technology in Dundee was stored in QR codes on posters throughout the city.

To enable the project to represent the most up to date research and to represent the breadth of Dundee's technological discoveries, the assistance of the Digital Science Festival Working Group was crucial. University of Dundee, Duncan of Jordanstone College of Art and Design, The McManus Art Gallery and Museum, Superfly (a local company specialising in creative use of QR codes) and University of Abertay Dundee – all advised the festival management team on the technical aspects of the trail, as well as informing and providing content for the QR codes. Local companies such as NCR (a worldwide leader in ATM technologies), Scottish Enterprise and brightsolid (specialists in online technology and data management) provided the project with up-to-date information on their new products or services, to ensure content was relevant.

Whilst it was necessary that users had a mobile device to scan the QR code to gain information, it was important that the project was as accessible and user-friendly as possible. QR codes were therefore not linked to URLs and instead were offline and text-based. This meant that curious passersby could quickly scan the code, learn more about what the poster related to and its 'Dundee Discovery', and have the choice to learn more by clicking on a hyperlink that was embedded in the QR code text.

Having text-based QR codes made it difficult to analyse exactly how many people engaged with the posters, but anecdotal feedback has been positive.

To improve the accessibility of the project further, QR code trails and drop-in activities were held in Dundee Science Centre during the second free Family Fun Day (which attracted 735 visitors from Dundee and surrounding regions). Run in collaboration with the University of

Dundee, these QR code trails allowed visitors to borrow 3G-enabled iPods to explore posters distributed throughout the science centre. Additionally, there was a stand run by the TOTeM (Tales of things and electronic memory) project which enabled visitors to bring in an item to be 'tagged' with a QR code. These additional elements of the Dundee Digital Discoveries project allowed visitors to speak to experts in this area and learn more about what QR codes are and how they can be used to interact with one's surroundings or bring stories to everyday items.

Below. Copies of the ten QR code posters for 'Dundee's Digital Discoveries'



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