

EP/E022413/1, EP/E022081/1, EP/E022693/1[#]
Final Report - Stars 'r' Us!; The Cosmic Chemistry Connection
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Stars 'r' Us! is a collaborative project between Heriot-Watt university (Prof. Martin McCoustra) and the universities of Strathclyde (Dr. Helen Fraser), OU (Prof. Nigel Mason), Nottingham (Dr. June McCombie), UCL (Dr. Wendy Brown and Dr. Serena Viti) and Dr. Robert Massey (Science and Policy Advisor at the Royal Astronomical Society, formerly of the National Maritime Museum, Royal Greenwich Observatory). Our exhibit illustrates the relationship between astronomy, molecular physics and chemistry, and how they are fusing to make a new interdisciplinary science - Astrochemistry. Further information can be found at

<http://www.chem.ucl.ac.uk/cosmicdust/starsrus.html>

CONTEXT

This PPE grant was awarded to enable the grant holders to take the "Stars 'r' Us!" exhibit to the Royal Society Summer Exhibition in Glasgow (RSSEG) during the period 11th – 15th September 2006. The exhibition featured 22 competitively selected exhibits from around the UK, 17 of which had been previously displayed at the Royal Society Summer Exhibition (RSSE) in London in 2006. "Stars 'r' Us!" had featured in the 2004 London exhibition. The exhibition was held in the Glasgow Science Centre (GSC), and represented the first occasion that this prestigious event has been held outside its traditional London base. The RSSE is a major showcase enabling researchers to bring contemporary research to 16-18 year old school children, the public, and key members of the political and scientific community who are connected with policy making in UK science.

The grant(s) covered the three-month period immediately before, during and after the exhibition, from 1st July – 30th September 2006, with funding specifically targeted at the following areas:

1. Updating of the exhibit from its first showing in 2004.
2. Printing of revised publicity materials associated with the exhibit.
3. Costs associated with taking the exhibit to Glasgow.
4. Costs associated with the participation and training of the PhD student/postdoctoral team.
5. FEC costs associated with the time-input of the PI(s).

We exploited a unique opportunity to bring the "Stars 'r' Us!" exhibit to a new audience (in Scotland) and to update the exhibit to incorporate many of the recent advances in Astrochemistry, in particular the latest results from the laboratories of the grant holders, and the discoveries made by the SPITZER space telescope. At a time when studies in physical sciences are falling, a project such as "Stars 'r' Us!" is key, as it utilises the very visual science of Astronomy to illustrate simple Chemistry and Physics, and re-ignite, or even initiate, interest in these scientific disciplines.

BACKGROUND SCIENCE TO "Stars 'r' Us!"

We are all made of star stuff! Atoms inside us were forged in the nuclear furnaces of ancient stars, and subsequently scattered into deep space as these stars eventually explode and die. In the cold dark regions of space between the stars, gas and dust gather together in the stellar nurseries and chemical cauldrons of our galaxy. Reactions between atoms in these clouds form increasingly more complex molecules. Astronomers use these molecules to do some detective work – trying to establish how star formation and planet formation occur. Like forensic experts, they cannot actually be there when the event happens, and so they use spectroscopic techniques combined with imaging telescopes to 'see' into deep space. Looking there, we find over 220 different molecules in space. Some are simple like hydrogen gas, and some are more complex – like glycine – the simplest amino acid. Since all of the gas and dust in space eventually forms new stars and planets, we can use chemical evolution as a tracer of the star forming process. Observational evidence shows that new solar-systems are being formed constantly in our galaxy. "Stars 'r' Us!" follows this story, from star birth to death and back again. The story is told many ways, *via* posters, a video and interactive exhibits which allow the public to get hands-on experience with ideas such as spectroscopy.

The "Stars 'r' Us!" exhibit was developed in 2004, having been selected for the RSSE in London that year¹. For that exhibition we raised over £25,000 to fund the construction and running costs of the exhibit. Since August 2004, a reserve fund (< £1000) has been held at UCL to cover the (small) running costs of the exhibit and repairs as required. Sponsorship came originally from an award from the PPARC small awards scheme, EPSRC sponsorship, contributions from the Universities of Nottingham, UCL, and the OU, major sponsorship from the RSC and RAS, and minor sponsorship from subject groups of the RSC/RAS/IOP and various industrial companies with whom we usually do business. With the appointment of Dr H.J. Fraser to a permanent position in Strathclyde in 2005, and the move of Prof. M.R.S. McCoustra to Heriot-Watt University in August 2006, these universities also invested in the project. Since 2004, the exhibit has been used at University open days by all of the partners in the project. The university concerned has covered specific costs for such events, usually amounting to transporting the exhibit from its storage at the University of Nottingham. Due to institutional changes the posters and written material, as well as list of sponsors, have been reprinted four times since the original event (once in French), funded each time by a different source. However, no

[#]Note that these three grants were applied for and granted as a set of linked PPE proposals with a single Case for Support. This report serves as the final report for all three grants.

major revamp of the exhibits themselves was undertaken and no major monies for repairs were sought since the inception of this project. In addition to the 2004 RSSE, the exhibit has been shown successfully at the following national and international events, with costs covered either by us or by the named event organiser:

- London - National Science Week RGO/NMM, Greenwich March 2005 and 2006.
- Athens – Einstein Year, June 2005, (invited by British Council, Athens).
- Chelmsford - International Scout Jamboree, July 2005, (invited by Scout Association following a visit to the Royal Society Summer Exhibition 2004 by the organiser of the scout jamboree).
- Paris - Village des Science, October 2005, (invited by British Council, France).
- Newcastle, Manchester, Brighton, Nottingham - UK Chemistry Week Shopping Centre Tour, November 2005 (on behalf of the RSC).

PROJECT PLAN REVIEW / PROJECT MANAGEMENT AND PARTNERSHIPS

Week comm.	July 3 rd	July 10 th	July 17 th	July 24 th	July 31 st	Aug 7 th	Aug 14 th	Aug 21 st	Aug 28 th	Sept 4 th	Sept 11 th
MMc	10 % time required to oversee; development of new 'eye to the telescope' display / refurbishment of existing displays					10 % time required to oversee re-felting of display stands		Exhibit transported to Strathclyde. (Aug 21 st)	10 % time required for minor changes to exhibit displays		Exhibition week 100% time 8.30am – 10.30 pm each day
WAB	40 % time required to; Update poster materials and postcards Order new felt for displays		20 % time required for poster ordering and printing, postcard ordering overseeing ordering of spares and parts for refurbishment of displays					Training day (Aug 22 nd)			
HJF	20 % time required for Redevelopment of video & ordering of plasma screen hire Coordination of brochure & website materials to Royal Society Coordination of sponsors and update of finance Management of hotel booking and team travel / accommodation for exhibit week					20 % time required Risk assessments & safety issues Insurance arrangements Paperwork of event including team management		Reassembly & testing	20 % time required for final alterations to exhibit and purchase/delivery of consumables planning of exhibitor time etc		

Figure 1. Time plan of activities and overview of project management

The original time management and task plan for this project is reproduced in Figure 1. Given the fixed time-frame of the RSSEG there was no leeway in the timing of the original plan when compared to the actual project and all activities were undertaken as specified. HJF acted as the liaison between the team and the Royal Society, and as such planned the team management during the exhibition week. The three grant holders were joined during the exhibition by the project partners, whose contribution constitutes the FEC equivalent of one week of each of their time. Their involvement in the project is documented separately. Furthermore, their expertise and input at planning meetings was vital to the updating and evaluation of the changes and to the implementation of the exhibit itself.

Our exhibition team was 25-people strong, ranging from established academics to undergraduate students. After the exhibition week, WAB supervised the return and storage of the exhibit, and HJF completed reports to sponsors and to the Royal Society. The timescales and deliverables were kept on track by ensuring regular update meetings were held between the grant-holders and the project partners. Meetings were usually at UCL as this minimised the travel times and costs for most of the team. In between meetings, significant checking and updating of files was conducted by email. Given the team's experience of exhibiting "Stars 'r' Us!" at a previous RSSE, we were able to look ahead and plan effectively. As MMcC had been liaising with the Royal Society at that time, he was able to offer help, advice and mentoring support to HJF who took this role on this occasion. It was therefore a very positive learning experience for her, as a young academic to be given significant responsibility in this project. In addition, the grant-team already had extensive experience working with the "Stars 'r' Us!" exhibit, and therefore did not feel they lacked in any particular skill area in executing the work.

DESCRIPTION OF OUTPUTS AND AUDIENCE / MEASUREMENTS AND MONITORING



Figure 2: The revamped "Stars 'r' Us!" exhibit. The video can be seen playing on the left-hand plasma-display, and the posters on the back display board. The hands-on exhibits are visible in the foreground, with white handout leaflets attached. Postcards are on the tables, with images taken from the display and video materials on the front, and the academic's contact details on the back.

The key aim of the “Stars ‘r’ Us!” exhibit is to bring the science of Astrochemistry to the wider public, and in doing so, to encourage particularly the 16-18 year old age group to appreciate the diversity of areas where science and technology are keenly applied in both research and our everyday lives. By featuring at the RSSEG, we were able to find a platform from which to achieve this aim, through personal contact with a young and dynamic team of scientists, communicating our exhibit of hands-on demonstrations and easy-to grasp explanations. The “Stars ‘r’ Us!” team strongly believe that the key to improving uptake of science and engineering careers amongst young people is to make science exciting and relevant to them without patronising anyone. The major activities undertaken as part of this project were:

1. Overseeing the revamp of the whole exhibit including re-covering the hands-on exhibit stands (costs of re-covering only funded from this grant).
2. Overseeing the manufacture of a new hands-on exhibit to illustrate the difference between seeing the night-sky in the infrared and the visible (costs of manufacture funded from other sources).
3. Updating and reproduction of the poster materials with new science.
4. Printing and updating of postcards and handouts associated with the exhibit, to include updated contact details for the team and information of educational benefit.
5. To update and refresh the team website (see address at start of report).
6. To update the video materials and CD-ROM materials, the former to be played at the exhibit and the latter to pass on to teachers as an educational resource.
7. Training of the PhD/postdoctoral team in communication skills for the exhibition week.
8. Participation of the whole team in the 2006 RSSEG.

An overview of the new exhibit is shown in Figure 2. The update and revamp certainly made the exhibit look much more presentable after two years on the road. The new exhibit had the desired effect, in that those of us who had worked on the stand previously found it much easier to deliver our explanations and hold the attention of the public/school children audiences. Handouts and posters were fully updated and drawing on our previous experience of manning and displaying the exhibit, pictures and wording in the posters were changed accordingly. Information was also provided on contact details for the academic team, leading to subsequent requests for schools talks and visits.

In addition to the above activities, we made a handout for teachers to request a CD of the materials to be sent to them for use in their own classroom – 10 such requests were completed during the exhibition week. Following one referee’s suggestion, PDF versions of these materials were also made available for download from the website. However the files are very large, which precludes many people being able to do this. It was not possible to make the video file available for download, because of the copyright on certain materials. We also gained permission from the RSC to reproduce a bundle of 3 articles in full-colour format, previously published in *Education in Chemistry*, one of which was authored by this team². These were handed out in person to teachers, and over 100 were distributed during the exhibition. Finally the exhibit was also featured in the officially produced DVD of the RSSE, including one of our PhD student helpers (see Figure 3), and Dr Robert Massey who has extensive media training and experience.

	Daytime and Tuesday evening				Private events	TOTAL
	Media	Students	Public	Subtotal	Evening	
Tuesday	0	279	112	391	n/a	391
Wednesday	0	384	99	483	174 (teachers)	657
Thursday	0	358	137	495	207 (science & policy)	702
TOTAL 2006	0	1021	348	1369	381	1750
London	50	1342	1886	3246	1313	4609

Table 1. Statistics on visitors to the event, and comparison with London 2006 (data from Royal Society)

The demographics of the audience reached were provided by the Royal Society (see Table 1). Given that our time during the exhibition was required to actually engage with the public, and that the Royal Society request individual exhibitors NOT to gather statistical information, we must rely on the detailed feedback of the Royal Society as well as on our own anecdotal evidence, for how successful our exhibit was. 30% (104 / 348) of all public visitors completed a brief registration form on arrival, 11% (38) of whom also completed a feedback questionnaire. Replies showed that 54% of public visitors were aged under 40, 39% of public visitors were female, 26% of public visitors were students (University degree or PhD), 37% of public visitors were in full time employment. 95% of those who returned the feedback questionnaire rated the Exhibition 1 or 2, on a scale where 1 is very interesting and 5 is not at all interesting. 92% of those who returned the feedback questionnaire rated the explanations given by exhibitors as 1 or 2, on a scale where 1 is very clear and understandable and 5 is not at all clear or understandable. 90% of visitors who returned the feedback questionnaire said that their interest in science had increased as a result of visiting the exhibition. The team found members of the public very interested in our stand, and we were assisted in catching attention by being positioned opposite the entrance doors of the main exhibit hall, where we were therefore the first thing people saw as they entered.

31 school groups attended the event, of which 97% came from the non-independent sector. However, what is not clear from this statistic, and was only clear after the event from local knowledge, was that the Royal Society did not

write to inform local independent schools of the event. 44% of teachers at the schools visits and soiree event combined said it had given them inspiration for future activities. 23% of schools were from at least 50 miles outside Glasgow, including Aberdeen, Inverness, East Lothian and Dumfriesshire, and 59% of school children visiting were female. Schools were allocated specific times to arrive at and visit the exhibit, which resulted often in a mad rush of 'people' at 10 am and 2 pm, but almost no students over lunch time or after 4 pm. Media coverage and publicity of the event was all handled by the Royal Society, who make an excellent effort in the London show to publicise the event on radio, newspapers and on public transport. Such publicity was lacking in Glasgow on this first occasion. Coupled with the less than accessible location of the exhibit (GSC is on the south side of the river 2 miles from the city centre, whereas the Royal Society in London is very centrally located), the specific scheduling of schools parties, and the press-embargo insisted upon by the RS, public and media attendance at this exhibition was significantly lower than that in London (see Table 1). Such information has been fed back to the Royal Society for future Glasgow events, but none-the-less, from the audience available to us we were able to disseminate a wide range of information and facts on Astrochemistry.

The team who worked on the display during the exhibition week included the three grant holders, plus 5 other academics, including Dr Alex MacKinnon of the Department of Adult Continuing Education at Glasgow University (brought on board for his communication skills and local knowledge), two staff members from Nottingham University and the ROE with extensive outreach experience as the main function of their job, 3 PDRA's (from UCL and Heriot-Watt), 6 PhD students plus 3 additional students about to embark on their PhD studies (from UCL, Heriot-Watt and Strathclyde), and 3 local (Strathclyde/Edinburgh) undergraduate students, who were undertaking summer projects in Astrochemistry. All of these staff attended a one-day meeting in Strathclyde to learn how to assemble and use the exhibit. They also received training in communication with the public and gave a 5-minute talk about the exhibit on which they received feedback, especially from Dr Robert Massey, an expert with significant experience in outreach, communication and media work. This was key training for the team members, who acted not only as ambassadors for their universities, but also for science and its public image as a whole.

During the exhibition week, "Stars 'r' Us!" was manned by teams of 8 people, including 2 academics and one PDRA per shift, with the members distributed so that different people worked together each day. Shifts lasted around 2.5 hours, so that each team member could rest and relax between consecutive shifts. It was reassuring to see the most confident of the PDRA/PhD/undergraduate team step forward and start engaging children and the public in our exhibit. As the week progressed, students clearly learnt more communication skills by watching each other, and as such improved their own communication skills. We certainly benefited from having run the training day, and will undertake similar training before other major events in the future.

EVALUATION & IMPACT

The RSSE in Glasgow was an ideal platform from which to expose the public and opinion formers to our research, and therefore fits directly with the aims of the EPSRC PPE program:

- **Stimulating Public Interest** – "Stars 'r' Us!" was designed with the specific intention of bringing basic Physics and Chemistry to the public through the exciting science of Astrochemistry. This is achieved through direct discussion between the team manning the exhibit and members of the public attending the exhibition. Posters and a video, which the public could watch independently, and a series of hand-outs, postcards and leaflets were also available. The leaflets were associated with 4 interactive exhibits; 'Seeing Stars', which demonstrates basic electronic spectroscopy (see Figure 3), 'Recreating Space', a sweet-filled UHV chamber which demonstrates the experimental techniques used by Brown, Fraser and McCoustra in laboratory astrophysics, 'Eye to the Telescope or Seeing the Unseen', which illustrates the difference between the infrared sky and visible stars, and 'Chemistry to Life', a mock up of the Urey-Miller classic experiment showing how a few chemicals, water and lightning can produce the ingredients for life. The latter did not feature in this exhibition as space in the exhibit hall was limited.
- **Public debate between scientists and public** – the opportunity for teachers, educators, policy makers, the general public and school children to meet numerous scientists at one time, face-to-face and talk to them, is a key objective of the RSSE. To feature successfully at such events it is imperative that the whole team engage with the visiting public and children. Our training day was vital in ensuring that all of the team, from academics to undergraduates, had the skills required to approach the visitors, and to tell a coherent, scientifically accurate story on a level they could understand. Many visitors ask questions, have visited our website or sought additional information from the academic team *via* the email contact details on our postcards.
- **Inspiring the future generation in SET** – the "Stars 'R' Us!" team applied to exhibit at the RSSEG specifically because we wanted to bring our science to the audience in Scotland. With two members of the team now working in Scottish universities, it was crucial to establish good links with local schools, and to engage students in SET activities, through material less dry than their school studies. The figures given previously clearly showed that at least 50 % of our audience was of school age, and anecdotally our stand was continually one of the busiest – perhaps initially because of the lure of free sweets, but we used this as a ploy to start them talking and questioning the science on the stand! On more than one occasion teachers would come and drag children away for lunch or to catch the bus – such enthusiasm is exactly what we are aiming to stimulate with "Stars 'r' Us!" In addition, we found the revised and revamped materials very effective in communicating our story of chemistry in star formation.

Fig 3. Collage of outputs from Stars 'r' Us! exhibit. Clockwise from top left; A PhD student explaining the new exhibit, 'Seeing the Unseen'. 2nd photo – a PhD student being interviewed for the Royal Society DVD of the event. 3rd photo – the UHV 'sweets' chamber. 4th – photo – the new telescope, part of the new hands-on display produced for this exhibition. 5th photo - Members of the team at work during the exhibition. Final photo – the 'seeing stars' exhibit was a big draw to visitors of all ages.



- **Build and sustain a community of researchers in SET** – Clearly, “Stars ‘r’ Us!” has been operating for a much longer period than the lifetime of this PPE grant. The outcomes and future activities of “Stars ‘r’ Us!” are detailed in the next section. We have utilised the exhibit on a regular basis over the past two years, and with our participation in the RSSEG, have had the opportunity to update the exhibit and to train a new generation of PDRAs and students to assist with future events. Only 1 PDRA from the Glasgow team had previously participated in “Stars ‘r’ Us!”, so our team training was a clear building block for the future. Many of the team, from academics to undergraduates, have gone on to apply the skills learnt during this grant to other related PUS activities.

Overall we consider that our participation in the RSSEG was a success, and that we were able to get key concepts from Chemistry and Physics across to our audience, illustrating the emerging science of Astrochemistry. Our target audience was, in essence, provided for us and issues related to that have been discussed previously and passed on to the Royal Society. In executing the project we typically faced only minor problems and mishaps, many of which were beyond our control. In the future we plan to train and refresh the “Stars ‘r’ Us!” team prior to an event, as the training clearly made a difference to the quality of delivery provided by the students and PDRAs.

In addition to our goals in communicating science to the public arena, and training the younger members of our team in communication skills, “Stars ‘r’ Us!” also forges strong links between the academics working in laboratory astrochemistry and its applications in the UK. McCoustra, Fraser, Brown and Mason continue to work on joint research projects, and Viti has now collaborated with McCoustra and Brown in applying their laboratory work to astrochemical modelling and is starting collaboration with Fraser in observational astrochemistry. The strong social connections forged between the students of these research groups helps them immensely in discussing their own research work with each other across the astronomy and chemistry disciplines, as well as building the community of young UK astrochemists. Finally, by offering the chance for undergraduate students to participate in this project, we have encouraged a number of smart young scientists to consider further study and research work in our field.

EXPLANATION OF EXPENDITURE

All funds were spent in full as per the original amounts requested in the grant application. Directly Allocated Costs covered the time invested by Brown, Fraser and McCoustra in overseeing and managing the project. Over the lifetime of this grant these rates are equivalent to an average of 7.5 hours per week for Brown and Fraser over the 3 months of the grant: this consists of 5 full days at the exhibition plus a total of 0.5 days per week for the other 12 weeks of the 3 month period. The amount spent for McCoustra covers an average of 3.75 hours per week which consists of the 5 full days at the exhibition. All the Directly Incurred costs requested on this grant were also spent in full. In fact, more than the sums requested was spent, but the difference was covered by external funding and sponsorship, received from the partner universities, Institute of Physics in Scotland, RSC, subject groups of the professional bodies, and numerous industrial companies with whom we usually do business. The project partner (PP) effective contributions are also listed in the JeS submission form, and are detailed in separate file attachments.

At UCL, travel and subsistence costs covered the costs of transporting the team not local to Glasgow to the University of Strathclyde on August 22nd for the training day, and for the exhibition itself. Flights were booked well in advance to take advantage of cheap fares, and cost a total of £2233 (£1000 of this was charged to this grant). Additional subsistence costs, for food and travel during the exhibition week, and in travelling to/from the departure airports on training day and exhibition week cost £1687 (£340 of this was charged to this grant). Note that in the original proposal it was envisaged that these costs would be covered by the Strathclyde portion of the grant, and costs for travel meetings by UCL. However, to expedite expenses claims by all team members these cost divisions were switched in the final charging process. All team members had to provide receipts for their subsistence, and were limited to a £5 lunch allowance and £15 dinner allowance. No reimbursement was made for alcoholic beverages, and where feasible, public transport used. Additional costs of £80 were incurred to ensure the participants from UCL were adequately insured both in their own work and for public liability during the exhibition. In a slight deviation from the projected costs described in the original proposal, and given the availability of suitably qualified van drivers for the transport of the “Stars ‘r’ Us!” exhibit between Nottingham and Glasgow and then from Glasgow to London, costs of £1180 were incurred. This includes £180 associated with the van hire costs for transport from Nottingham to Glasgow, and the remainder is the costs required to hire transport to collect and deliver the “Stars ‘r’ Us!” between Glasgow and London. These sums total £2600. Other costs incurred by UCL include the full costs of reprinting the posters for the exhibition, leaflets and

postcards, as well as the custom made end caps for the exhibition stand detailing our sponsors (see Figure 2). Total costs of this reprint and transport of the materials directly to Strathclyde for the exhibition were £2894. This is slightly higher than the original estimate. However, total refurbishment costs for the new stands and felts were £532, £206 of which was paid from this grant. Total expenditure on other items was therefore £3100.

At Strathclyde, the travel and subsistence costs covered the costs of the hotel accommodation during the exhibition week (£3900). A special rate was negotiated with a hotel located within safe walking-distance of the GSC. An additional £250 was spent on taxis transporting the team to and from the airport in Glasgow, and bringing local team members home after the evening soirees, when public transport was not a viable option for transportation. £200 was spent on subsistence and related costs for the training day at Strathclyde University, where 25 of the team were present for 8 hours training session. £350 was spent on sweets and water for the exhibition week itself; the former for the UHV 'sweet filled' chamber! The water was provided for the exhibitors, as GSC is situated nowhere near any amenities, and its own cafes are consequently quite pricey. To attend the planning meetings cost in excess of £400, £300 of which was charged to this grant. The remaining costs incurred at Strathclyde for attending planning meetings, and parts and labour associated with the exhibition were paid from alternative sources of sponsorship (see above). Total costs = £5000.

FURTHER DISSEMINATION ACTIVITIES

The "Stars 'r' Us!" exhibit is currently being stored in UCL Chemistry. Once again a small float fund (< £1000) is being maintained at UCL, with monies from industrial sponsors, to continue running the exhibit. Following on from the RSSEG the following dissemination activities have been/will be undertaken:

- **"Stars 'r' Us!"** is to feature again during the National Science Week activities at the Royal Greenwich Observatory / National Maritime Museum (March 2007), and possibly at the Edinburgh Science Festival (April 2007) and a science festival planned for the summer of 2007 in Milton Keynes. Additional discussions are underway to transport the exhibit to South Africa in 2008 as part of the outreach programme for the SALT telescope, and subsequently to visit local townships providing a very new audience with exposure to the field. Discussions are also underway for the exhibit to feature in the Dark Skies project (a major PPARC-funded outreach activity in Scotland), whereby astronomy, observing and the related scientific disciplines are taken throughout Scotland to schools and the public, especially in the remoter areas of the Highlands and Islands. In addition, the exhibit continues to be used on a regular basis by all of the partner collaborators for demonstrations at their University Open days.
- **Schools and teachers** showed significant interest in our exhibit and especially the associated materials we produced. A compendium of relevant articles on Astrochemistry appearing in the RSC Education in Chemistry journal was prepared (with the permission of the RSC). This included an article by some of the "Stars 'r' Us!" team². This proved very popular with over 100 copies being distributed. A CD of the display materials and handouts was also made available to teachers, for which around 10 requests were received during the Glasgow exhibition. These disks have now been distributed.
- **The "Stars 'r' Us!" website** is being constantly maintained and updated, with details of the background science on the exhibit, details of the exhibit itself, and pictures from events at which the exhibit features. A 1st year UCL Chemistry PhD student, who helped with the exhibit for the first time in Glasgow, is now maintaining this website.
- **Schools visits** resulting from direct contact between the "Stars 'R' Us!" team and local teachers during the Glasgow Exhibition have lead to Dr. Fraser and Prof. McCoustra making new and vital contacts with schools within Scotland. Visits have ranged from discussing Astrochemistry across a wide range of year-groups, to more focused work on curriculum related science in the Standard and Higher grade syllabi on stars, planets and solar systems. Two of the UCL researchers who were involved in the Glasgow Exhibition have subsequently used their experience to become schools ambassadors, regularly giving talks associated with Astrochemistry and the science behind the "Stars 'R' Us!" exhibit at London schools. One Glasgow student has also gone on to work on the Dark Skies Project, building on the skills she developed as part of this programme.
- **A legal agreement** has been drawn up between the interested parties in this collaborative project, detailing future bookings, ownership, storage, payment and use of the "Stars 'r' Us!" exhibit.

References

¹S. Viti, et al, "The making of Stars R Us!", *Astronomy and Geophysics*, **45** (2004) 6.22–6.24.

²M. R. S. McCoustra, et al, "To infinity and beyond", *Education in Chemistry* **42** (2005) 153-154