Science Board
9 and 10 October 2017

Minutes of the Sixty Second Meeting
Polaris House

Present:  
Professor Sean Freeman (Chair) – University of Manchester
Professor Jayne Lawrence (Deputy Chair) – University of Manchester (Chair for item 13)
Professor Stewart Boogert – RHUL
Dr João Cabral – Imperial College London (except items 1, 2 and 9)
Professor Peter Clarke – University of Edinburgh (except item 8)
Professor Bill David – STFC RAL/University of Oxford (except item 9)
Professor Christine Davies – University of Glasgow
Professor Rory Duncan – Heriot-Watt University
Professor Chris Hawes – Oxford Brookes University (Day Two)
Professor Ofer Lahav – UCL (except items 12 and 13)
Professor Andy Parker – University of Cambridge
Professor Don Pollacco – University of Warwick
Professor Tara Shears – University of Liverpool (except item 8)

Apologies:  
Professor Paul McKenna – University of Strathclyde

In attendance:  
Professor Gerry Doyle – Armagh Observatory (Chair of the Solar Physics Strategy Review) (item 9)
Rosemary Young – Science Programme & IPP Manager, UK Space Agency (item 9)
Professor Julian Osborne – University of Leicester (Deputy Chair, PPRP) (item 13)
Professor Jim Wild – Lancaster University (Chair of Astronomy Grants Panel) (item 12)
Dr Katherine Wright – Head of Space Science, UK Space Agency (item 12)
**STFC:**

Tahmina Aziz – Secretary PPRP (item 13)
Professor Grahame Blair – Executive Director Programmes (item 4)
Malcolm Booy – Senior Programme Support Manager (item 7)
Kim Burchell – Astronomy Grants Programme Manager (items 7, 12 and 13)
Jenny Hiscock – Programme Manager, Particle Astrophysics (item 8)
Charlotte Jamieson – Head of Enabling Themes (item 7)
Dr Jason Green – Head of External Innovations (item 4)
Dr Andrew Le Masurier – Head of Education, Training & Grants Policy Group (item 4)
Trish Mullins – Secretary, Science Board
Dr Janet Seed – Associate Director, Strategy, Planning and Communications
Dr Emily Swaine – Secretary, Skills and Engagement Advisory Board (item 11)
Chris Woolford – Astronomy Facilities Programme Manager (items 7, 9, 12 and 13)
Dr Victoria Wright – Head of Research and Innovation (items 6 and 10)
Dr Judith Youziel – Science Strategy Manager (items 6 and 10)
1. **Agenda Item 1 - Welcome**

1.1. The Chair welcomed everyone to the meeting, particularly Professor Boogert, RHUL, who was attending his first meeting. Another new member, Professor McKenna, University of Strathclyde, was unable to join the October meeting due to pre-existing commitments and would join Science Board for its December meeting. Professor Hawes would join for Day Two.

1.2. Science Board offered its congratulations to Professor Davies who had been made an Institute of Physics Honorary Fellow “for her world-leading achievements in particle physics research and her sustained record of outstanding academic leadership”.

1.3. The Chair reminded Science Board that STFC regularly shared sensitive information and, as a result, it was essential to maintain confidentiality at all times. It was also essential to declare all conflicts of interest. The Chair reminded everyone that requests for information and feedback received by Science Board from the community must be directed to STFC for attention.

2. **Agenda Item 2 - Minutes and Actions (SB.17.61)**

SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

2.1. The minutes of the meeting held on 29 and 30 June were approved.

2.2. Actions from the meeting were reviewed. Actions that were incomplete were discussed and Science Board updated them, as appropriate.

3. **Agenda Item 3 - Update from STFC (SB.17.62.01)**

SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

3.1. Science Board received an update from Dr Seed on STFC activities, including progress relating to the establishment of UK Research and Innovation (UKRI) and STFC’s budget for 2017-18 and 2018-19.

3.2. Science Board noted that, during the autumn, STFC was to conduct a review of the operation of the Advisory Boards to Council similar to the annual exercise conducted by STFC’s Council. STFC was also planning a review of the Science Challenge questions, and Science Board and the Advisory Panels would be involved in this activity.
4. Agenda Item 4 - Update from Programmes Directorate

SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

4.1. The Chair welcomed members of the Programmes Directorate to the meeting, particularly the presenters, Professor Blair, Executive Director, Programmes, Dr Green, Head of External Innovations, and Dr Le Masurier, Head of Education, Training and Grants Policy Group.

4.2. Professor Blair gave an overview of Programmes Directorate, including its structure, Division Heads, main groups, advisory structure, evaluation system and 2017/18 budgets. Science Board noted the issues for each programme area.

4.3. Programmes Directorate staff had essential governance roles in many international organisations, including CERN, ESO, ESRF, ESS, FAIR, ILL, SKA and XFEL. These roles included membership of Councils, finance committees and industrial liaison, and providing communication links with BEIS and the Foreign and Commonwealth Office. This was a significant aspect of the work of Programmes Directorate and these lynchpin roles were not always recognised by the community.

4.4. Programmes Directorate also had a significant role in looking at business opportunities, for example, aligning companies to opportunities arising in international facilities. External Innovations provided funding through a variety of schemes to facilitate collaboration between STFC researchers and business, and provided support to STFC researchers for commercialisation. Global challenges now formed an important aspect of STFC programmes, with a focus on the priority areas of Energy, Environment, Healthcare and Security.

4.5. The 21st Century Challenges group was leading the STFC’s involvement with the Global Challenges Research Fund (GCRF) and Newton Fund programme delivery. STFC’s Public Engagement (PE) programme was one of the largest PE programme across the Research Councils with STFC being a leader in STEM engagement.

4.6. Dr Le Masurier gave an overview of the Centres for Doctoral Training (CDT) in Data Intensive Science, including the context and background for this initiative. Following the peer review of eight very strong proposals, one centre had initially been funded. Following the announcement of additional funding aligned to the government’s industrial strategy STFC had awarded studentships to all eight CDT bids starting in 2017. In addition, four accelerator science studentships were funded at the Cockcroft Institute and two additional CASE studentships.
4.7. Science Board understood the rationale for funding all eight CDTs and accepted the need to respond quickly to funding opportunities.

4.8. Dr Green gave an overview of the GCRF, which had started with a low funding level rising to 2020/21. There were four main strands for funding:

4.8.1. £3.5M had funded a scaled-down, combined version of two projects submitted by Diamond Light Source to the RCUK GCRF collective call (START – Synchrotron Techniques for African Research and Technology);

4.8.2. £100k p.a. was sponsoring 20 graduate-level summer studentships from sub-Saharan Africa, Asia and Latin America to work on ATLAS and CMS. This was providing real traction with CERN;

4.8.3. £160k p.a. for a joint UK-China SKA Training Programme to support joint programmes for PhDs and postdocs. This maximised the benefits of the UK’s existing links with China;

4.8.4. £4M for the STFC Foundation Award call due to be agreed later this month. It was hoped that a second call could be launched in 2018.

4.9. Science Board noted that, while early GCRF and Newton projects had focussed on collaboration with China, there were also significant projects in other areas, for example, successful astronomy projects in sub-Saharan Africa. STFC was working with its communities to ensure a higher level of successful engagement in GCRF and Newton Fund.

5. Agenda Item 5 - Updates from the Chair

SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

5.1. The Chair updated Science Board on his attendance at the last two Council meetings and the Particle Physics Town meeting held in July.

5.2. The July Council meeting had included a discussion with Professor Harrison, CEO of Diamond Light Source, who had given an update on DLS. Council had also considered the recommendations from the PPAN Balance of Programme exercise. The Neutron Strategic Review and the Science Board science highlights had been very well received.

5.3. The Council meeting in September had been linked to a strategy meeting, including a tour of the Daresbury Laboratory campus and a discussion on the plans for the campus and its impact on the local economy.
5.4. In July, the Chair had also attended the Particle Physics Town meeting. Messages from the meeting included the community’s concerns about the way STFC’s peer review process will work under UKRI, how the community maximised the opportunities arising from GCRF funding, “review fatigue” and concerns relating to the timing of consolidated grant review periods.

5.5. A meeting had taken place on 26 September bringing together the advisory groups for UKSA and STFC. The meeting had included updates from the two organisations, including the peer review processes in each. Discussions had included the issues faced by UKSA and STFC in working with the European Space Agency (ESA), particularly the short timescales for the provision of science advice and input from STFC. The community had concerns relating to the perceived lack of funding for bilaterals; UKSA clarified that, while in principle there were no obstacles to funding bilaterals, it was essential to maximise the impact of the ESA subscription and thus support for ESA missions was the highest strategic priority for UKSA. The criteria for ESA funding decisions included priorities other than scientific excellence and this had the potential to lead to misunderstandings within the STFC research community as ESA decisions did not always closely reflect STFC science priorities. UKSA was working to ensure improvements in information flow from ESA panels via UKSA to the community. STFC would ensure that UKSA representatives were invited to attend Science Board meetings for all space-related items.

6. Agenda Item 6 – Accelerator Strategic Review (SB.17.62.02)

SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

6.1. The Chair welcomed to the meeting Dr Wright, Head of Research and Innovation, and Dr Youziel, Science Strategy Manager. Science Board noted that Professor Boogert was currently a member of the Accelerator Strategy Board and the Chair of the panel that is overseeing the development of this strategic review. Professor Duncan was also a member of the review panel.

6.2. Dr Youziel outlined the background to the Strategic Review, including the timeline, the STFC programme and the purpose of the Strategic Review. Science Board’s role was to assist in the strategic scoping role. STFC’s Executive Board (EB) had identified high-level priorities for the accelerator programme.

6.3. To provide an understanding of where investment and resource might be targeted, five thematic roadmaps had been developed, coordinated by community members and involving community consultation. To ensure consistency between the roadmaps, common questions were set for the
thematic groups to answer. To aid the discussion at Science Board, two members of Science Board had been assigned to lead the discussion on the science priorities for the areas covered by each roadmap. Science Board was asked to use its knowledge of STFC’s science priorities to provide guidance on the shape of the accelerator programme and to comment on the linkages between the roadmaps and STFC’s delivery of science.

6.4. Science Board discussed the first two of the five thematic roadmaps.

7. **Agenda Item 7 – Balance of Programme (PPAN) – STFC Response to Balance of Programme (SB.17.62.03; SB.17.62.04)**

Some references in this section have been redacted as official sensitive

7.1. The Chair welcomed Ms Jamieson, Head of Enabling Themes, Mr Booy, Senior Programme Support Manager, Mr Woolford, Astronomy Facilities Programme Manager and Ms Burchell, Astronomy Grants Programme Manager.

7.2. Ms Jamieson gave an overview of the STFC responses to the recommendations of the PPAN Balance of Programme starting with a reminder of the context for the exercise, the report for which had now been published by STFC. There was a three-year cycle to consider the balance over all PPAN programmes which meant that the next such BoP exercise would deliver by the end of 2019.

7.3. The purpose of the programme evaluations was to consider the portfolio and science strategy and to define a balanced programme of excellent science within a realistic financial planning envelope for each scientific discipline. The timetable had been agreed with the review of computing as the first review (quarter 4 of 2017). Each evaluation was expected to take around six months. Evaluations of the Projects Research and Development (PRD) scheme and the consolidated grants scheme would also be undertaken.

7.4. The terms of reference, process and timeline for each programme evaluation would be consistent, as far as possible. The evaluation panels would include experts from the community and grant panels, together with cross-disciplinary expertise. This would include Science Board representation on the evaluation panels and, to ensure consistency between panels, the Science Board members would be asked to establish a core group that would share best practice. The timetable was to complete all evaluations by May 2019 to ensure that all evaluation input was available for the next Balance of Programmes exercise, which would report to Science Board in December 2019.
7.5. In discussion, Science Board raised a number of issues, including:

7.5.1. The order of the programme evaluations had been amended from that previously shared with Science Board due to other pressures, for example, the timing of consolidated grant rounds;

7.5.2. There was a perception in the community that there were too many reviews in some subject areas.

7.6. Science Board discussed in detail the STFC responses to the recommendations of the PPAN Balance of Programme exercise and made comments for each area.

7.7. Science Board was asked to consider whether there were specific issues or questions that should be considered in the programme evaluations.

7.8. Science Board received an overview of the current process for allocating the funding of academic time. The paper outlined the way in which each grant panel currently awarded academic time.

7.9. To help universities understand the limitations of funding for academic time, Science Board encouraged STFC to be as open as possible in its discussions.

8. **Agenda Item 8 – Statement of Interest: R&D for UK Participation in a Next-Generation (G3) Dark Matter Search (SB.17.62.05)**

SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

8.1. The Chair welcomed to the meeting Ms Hiscock, Programme Manager, Particle Astrophysics.

8.2. The introducer gave an overview of the proposal. The proposal sought funding to provide for R&D leading to the construction of an ultra-low next-generation 30-70 tonne liquid xenon experiment for the first detection, or the detailed characterisation of weakly interacting massive particles (WIMP) should the first observation be made by another experiment before completion of this device. The proposal had been prepared by nine of the UK Lux-Zeplin (LZ) institutes, all of which were currently leading areas with LZ or making significant contributions. The intention was to exploit and safeguard previous STFC investment. The proposal would also strengthen and forge partnerships with other similar groups.

8.3. Science Board noted that the 2016 Particle Physics Advisory Panel roadmap recommended that “the UK should provide capital-phase support for construction of LZ and continuity towards directional sensitivity” and the
recent STFC Balance of Programmes review had noted that “as the primary focus of the [LZ] activities moves to the operation of the detector and science exploitation, there is a need to continue to pursue R&D and technology development for G3 dark matter experiments”.

8.4. Science Board noted that STFC will undertake a detailed programme evaluation for the particle astrophysics area in early 2018. Science Board agreed that the proposal should be considered as an element of this evaluation, prior to a decision on any consideration by the Projects Peer Review Panel (PPRP).

9. Agenda Item 9 – Solar Physics Strategy Review (SB.17.62.06) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

9.1. The Chair welcomed Professor Doyle, Armagh Observatory and Chair of the Solar Physics Strategic Review panel, Mr Woolford, Astronomy Facilities Programme Manager, and Ms Young, Science Programme & IPP Manager, UK Space Agency, who had been involved in this review as the UKSA’s representative.

9.2. For Professor Doyle’s benefit, there was a round table of introductions.

9.3. Professor Doyle gave an overview of the review recommendations, reminding Science Board of the context for the review which had been conducted by an ad hoc panel to ensure the strategic landscape in this research area is well-defined and up to date. The starting point for the review had been the 2015 report of the Solar System Advisory Panel. The recommendations of that roadmap remained and the new review should be seen as an update/extension. The review panel had consulted the UK solar physics community to identify critical capabilities and facilities (both space- and ground-based).

9.4. Science Board learned that, prior to 2008, most solar physics work had concentrated on space missions. However, there was now an increasing use and need for ground-based facilities (such as (DST\(^1\), SST\(^2\), Big Bear\(^3\), DKIST\(^4\), EST\(^5\) and NLST\(^6\)). DKIST was under construction, while EST and NLST were being planned.

\(^1\) Dunn Solar Telescope
\(^2\) Space Surveillance Telescope
\(^3\) Big Bear Solar Observatory
\(^4\) Daniel K Inouye Solar Telescope
\(^5\) European Solar Telescope
9.5. The recommendations of the strategic review were that:

9.5.1. The community needed multi-wavelength/multi-facility access with levels of investment that ensured the community had access to data across all wavelengths and leading involvement in instrument build and development;

9.5.2. Future investment should not be at the expense of core strengths or to the detriment of existing investments;

9.5.3. The community had made very strong statements regarding the need for significant investment in HPC facilities, particularly for modelling and data analysis;

9.5.4. Future opportunities in the space-weather domain were highlighted;

9.5.5. STFC (and NASA) might consider whether there was scope for seedcorn funding to support activities relating to small missions or R&D activities, which may be a springboard for industrial engagement;

9.5.6. The need for additional studentships, including industrial studentships, was highlighted.

9.6. The Chair thanked Professor Doyle for the report and presentation and asked that its thanks be extended to the Solar Physics Strategy panel for the recent review.

9.7. Professor Doyle, Mr Woolford and Ms Young left the meeting and Science Board continued its discussion in a closed session.

9.8. Science Board noted that one of the drivers for conducting the solar physics review had been to define the strategic landscape for the area and to determine the scientific context for an SOI for the proposal ‘UK Participation in the European Solar Telescope (EST)’, considered by Science Board at its February meeting.

9.9. Science Board agreed that the SOI for EST would be re-considered at its meeting in December.

6 National Large Solar Telescope
10. **Agenda Item 10: Accelerator Strategic Review (SB.17.62.02)**

SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

10.1. The Chair welcomed Dr Wright and Dr Youziel. Dr Wright recapped on the discussion from the previous day (agenda item 6).

10.2. Science Board discussed the remaining roadmaps and provided short statements for each.

10.3. It was agreed that draft statements for each roadmap would be circulated and that Science Board would provide input and comments by 17 October.

11. **Agenda Item 11 – Update on the Skills Balance of Programme**

SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

11.1. The Chair welcomed to the meeting Dr Swaine, Secretary of the Skills and Engagement Advisory Board (SEAB). Dr Swaine gave an overview of the Skills Balance of Programme (BoP), including an update from the recent Skills BoP subgroup meeting held on 2/3 October. Professor Clarke was the Science Board cross representative on SEAB who was also a member of the Skills BoP subgroup.

11.2. The objective of the Skills BoP was to identify a desirable skills programme balance over the next 5 year period. Input had been taken from two community consultations, together with critical skills requirements (obtained through a range of sources). The subgroup had met three times and had identified and explored risks and opportunities across five areas of skills activities (apprenticeships, graduates, studentships, fellowships and public engagement). A number of financial scenarios (flat cash, flat cash plus 5%, flat cash minus 5% and an optimum scenario) had been considered. The consideration of an optimum scenario allowed the identification of areas where new investments could be made, for example, from ISCF and GCRF.

11.3. The draft BoP report would be considered by SEAB in November; the key emerging issues and messages were shared with Science Board.

11.4. Overall, the subgroup felt that wider access to skills training across disciplines would increase benefits from skills investment and strengthen STFC’s case for attracting further investment.

11.5. Science Board discussed the percentage of students appointed to a permanent academic post as, with potentially nine in ten going into industry or other employment, it was important to ensure that students had a wide range of skills. Conversely, students provided a vital element of the core
programme and there was a strong link between PhDs and STFC research. It would therefore not be appropriate to solely provide the skills required by industry. STFC agreed to provide details on the proportion of STFC students whose final employment destination is an academic post.

11.6. An update on the Skills BoP would be provided to Science Board at its December meeting.

12. **Agenda Item 12 – Astronomy Grants Panel (SB.17.62.07)**

SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL SENSITIVE

12.1. The Chair welcomed Professor Wild, University of Lancaster, who was attending his first Science Board meeting as Chair of AGP, Ms Burchell, Astronomy Grants Programme Manager, Mr Woolford, Astronomy Facilities Programme Manager, and Dr Wright, Head of Space Science, UK Space Agency.

12.2. Professor Wild gave the AGP report on behalf of the panel, outlining the timetable and process for ranking. Science Board noted that each proposal is divided by project, with multiple referees per project. There is an initial numerical grading for each project using standard scoring criteria (the scoring has remained unchanged for this year’s panel, following evolution over the previous rounds). The sub-panels meet to discuss each project and agree a ranked list with recommended resources. A subset of the AGP merges the ranked list from the two sub-panels.

12.3. Process changes introduced at this round included a new ‘Technology Experts’ sub-panel created to ensure sufficient breadth of expertise on AGP to appropriately tension technical and exploitation/theory projects. In addition, to assist with panel workload, each proposal was assigned to six readers, blending together a range of expertise (rather than the previous process where all members read all proposals). To avoid issues of calibration and normalisation, the combination of readers varied across proposals.

12.4. Science Board noted a summary of the applications received, together with comparable statistics for the AGP rounds in 2016, 2015 and 2014 (2014 being the previous equivalent grant round). The number of applicants in 2017 had increased significantly over previous rounds (11%), with the number of projects rising by 9% and the requested PDRA staff rising by 11%.

12.5. The AGP analysis of the outcome had shown no evidence of varying success rates as a function of group size. Science Board noted the diverse
range of projects and science recommended for funding, including exploitation of ESA and NASA missions. STFC’s priority was to exploit the ESA subscription.

12.6. AGP highlighted the pressure on the exploitation budget, which had not kept pace with the expansion of the community. The UK astronomy community had a high European Research Council success rate and, with the decision of the UK to leave the EU, the continuation of this funding was now uncertain.

12.7. In discussion, Science Board raised a number of issues.

12.8. Science Board agreed that the process and procedure adopted by AGP was robust and fair. Science Board endorsed the recommendations of the AGP and Dr Wright endorsed the outcome on behalf of UKSA.

12.9. The Chair thanked the AGP and STFC AGP team for the report and presentation and for conducting the process very effectively, particularly given the challenging funding environment.


Some references in this section have been redacted as official sensitive

13.1. The Chair welcomed to the meeting Professor Osborne, University of Leicester and Deputy Chair of the Projects Peer Review Panel (PPRP), Mr Woolford, Astronomy Facilities Programme Manager, Ms Burchell, Astronomy Grants Programme Manager, and Ms Aziz, Secretary of PPRP. Professor Osborne had led the consideration of the proposal as the Chair of PPRP had a conflict of interest relating to JCMT.

13.2. Due to Professor Freeman’s conflict of interest, the Deputy Chair chaired this item.

13.3. The proposal requested a continuation of the support agreed by STFC in 2014, which had allowed the UK JCMT consortium to retain a ~20% share of the JCMT telescope. The majority of the funds would be transferred to the East Asian Observatory to support operations, with smaller amounts requested to support accommodation, travel and PI time.

13.4. Science Board noted that the JCMT is the largest single-dish terahertz/far-infrared/sub-mm observatory in the world, and is likely to remain so in the near future. The science case was well aligned to STFC priorities relating to cosmology and planet formation, with JCMT cited as a priority in the most
recent roadmap of the Astronomy Advisory Panel and in the recent STFC Balance of Programme exercise.

13.5. Science Board noted that the UK JCMT consortium involved the majority of UK scientists working in sub-mm astronomy and had an excellent track record of contributions to JCMT and also in terms of publication productivity.

13.6. The proposal was assessed against a background of a highly constrained financial environment. On balance, Science Board agreed with the recommendation of the PPRP that the proposal should be funded for three years at a level to match the level of universities consortium funding given in the proposal and that the travel and subsistence costs should be funded as requested.

13.7. Science Board accepted that this level of funding might result in some loss of targeted observations to the UK but felt that it would still ensure UK lead roles in the large surveys and a strong scientific return.

14. Agenda Item 14 – Information Papers

14.1. Science Board noted the information papers.

15. Agenda Item 15 – Any Other Business and Meeting Close

15.1. Science Board received an update on the focus group held at MRC in August to help shape priority areas for the STFC Challenge Led Applied Systems Programme (CLASP). The focus group had been attended by Professor Duncan, Professor Lahav and Professor Borghesi. Professor Borghesi had given a presentation (to which Science Board members had contributed) outlining STFC activity and areas of commonality between the RCs. The meeting had been attended by representatives of the other RCs, Cancer Research UK, industry and clinicians.

15.2. The Chair reminded Science Board of the importance of extending apologies for Science Board meetings with sufficient notice to allow the invitation to the meeting of non-core members or other expert attendees with the necessary core skills, should the need arise.

15.3. Science Board noted that its next meeting would be 18 and 19 December at the Rutherford Appleton Laboratory.