SUPA International Advisory Committee (IAC)

Meeting of 26th March 2015

The Gateway Boardroom, University of St Andrews

Summary of Discussions and Recommendations

Membership and Agenda

The Committee membership with affiliations is shown in Annex 1. The attached agenda at Annex 2 was adopted.

Welcome

It was a pleasure to welcome the new members of the Committee, who had been able to attend their first meeting of the IAC: Ruth Gregory, Wolfgang Sandner and Anneila Sargent.

Apologies

Apologies were received from Rolf-Dieter Heuer, Stuart Fancey, Ana Gallardo (represented by Frank Tooley of Scottish Enterprise), Helen Gleeson, Paul Hagan, David Miller, Colin Zimmerman.

SUPA Annual Meeting 25th March 2015

The SUPA Annual Meeting was held on Wednesday 25th March 2015 and the members of the IAC attended the event, the programme of which is included as Annex 3. This was an excellent meeting attended by a large and enthusiastic audience. SUPA IAC members took a leading role in the question and answer sessions following each presentation.

We congratulate all those involved in the development of the various themes on the excellence of the science and the quality of the presentations. We also appreciated the opportunity to view the short-listed finalists for the SUPA Video Clip Competition – again congratulations all round for this stimulating initiative. The day concluded with an inspiring talk on laser science, celebrating the International Year of Light, by Wilson Sibbett, in many ways the godfather of SUPA.

The IAC Meeting Thursday 26th March 2015

The CEO of SUPA, Jim Hough, gave a comprehensive account of the many activities which had taken place since the meeting of the IAC on 14 May 2014. Many of the issues raised in the report of that meeting have been addressed and the way ahead is clear for most aspects of the programme. We note the following achievements.

(1) The original five themes have all advanced successfully and the new themes in the areas of *Energy* and *Physics and the Life Sciences* have made very significant progress.
(2) The proof of the success of the SUPA2 programme is the excellent result of the Research Excellence Framework (REF) in which the participating Scottish Universities exceeded their performance in the 2008 Research Assessment Exercise, which was already very strong.

The investment in new positions and infrastructure has clearly paid off handsomely and could not have been achieved without SUPA.

(3) Following the aftermath of the award of the Nobel Prize to Peter Higgs in 2013, and the consequent Higgs Innovation Centre and Higgs studentships, as well as the significant progress of the Fraunhofer Centre and the International Max Planck Partnership, Glasgow has won a Quantum Technology Hub, in collaboration with Heriot-Watt, Strathclyde, Edinburgh, Bristol and Oxford. Strathclyde with Surrey will also be involved in a major way with the new management structure of the future programme of the National Physical Laboratory.

(4) Grant income has increased from £211M in the previous accounting year to £254M in the most recent year. The graduate student numbers remain healthy, although the numbers of applicants for the Prize studentships was somewhat down.

(5) We welcome the encouraging figures for the numbers of patents awarded and submitted and also the forthcoming submission for the Technology Scotland project. SUPA has been proactive in celebrating the International Year of Light and the Maxwell celebrations of the 150th Anniversary of the publication of his great paper of 1865 on *A dynamical theory of the Electromagnetic Field*.

(6) We also congratulate the members of the SUPA partnership on the winning of fellowships, prizes, etc. All these items testify to the health of physics and astronomy in Scotland. The IAC recognises that this could not have come about without a very large investment of effort on everyone's part.

New Management Arrangements

It was recognised in the 2014 report that new management arrangements had to be implemented over the period 2014 to 2017 as the funding for SUPA2 winds down. The IAC made recommendations in its 2014 Report, based on an analysis of the sustainability and affordability of SUPA by the Board of Directors. These changes are now being implemented and the route to the future is defined. The specific changes made include:

(1) The merger of the Graduate School and Knowledge Exchange (KE), or Knowledge Transfer (KT), activities has taken place. The Graduate School has been placed on a sustainable and quite invaluable basis for graduate student training thanks to the outstanding efforts of Avril Manners, whom we warmly thank for a great deal of complex, hard work. She will be moving to a prestigious teaching position in a distinguished Edinburgh School.

(2) The KT activities have been redefined into a much more feasible programme of interaction between the SUPA universities and industry. Key elements of the new arrangements are: (a) better connection between early career researchers with industry, (b) direct industrial experience for early career researchers who see this as a potential future career path, (c) enhanced international exposure of the research activities of SUPA of relevance to industry, (d) Continued Professional Development (CPD) for school teachers to support better physics teaching and increase the numbers of students opting for careers in STEM subjects. SUPA can contribute positively to all these objectives.

The IAC members appreciated the presentations made by the Knowledge Exchange and Training team to implement these objectives in a realistic way.

The IAC reinforces its strong support for the activities of the Graduate School. This has been an undoubted success of SUPA and the proposed arrangements maintain all the core elements of the programme at a sustainable cost. We understand that there are assurances that the funding for SUPA Central will continue into the long-term future, but cognisance must be taken of the changes in the Scottish Government which may make this a more challenging issue.

The plans for future outreach activities were also presented including increased support for the 'highers' physics syllabuses. Like most other universities, this is an essential part of the interaction of professional physicists with the public and schools. The CEO suggested that public outreach could become a future SUPA theme.

New CEO – Alan Miller

The IAC warmly congratulates Alan Miller on his appointment as the next CEO of SUPA. He has been involved in SUPA from the very beginning and understands thoroughly the many challenges facing the organisation. He gave his own view of the future challenges, in particular, on the topic of how well the institution of SUPA has fulfilled the original intention of being able to challenge and compete with the largest English Universities. Many different metrics can be used. The impression of his presentation was that very significant progress has been made towards that goal and by a number of measures, Scotland is fully competitive with the larger UK universities in England, but this is not the time to relax the endeavours to continue the upward trend.

The IAC wishes Alan all the best for his future endeavours, at the same time recording its enormous gratitude to Jim Hough for an outstanding contribution as CEO of SUPA for the last five years.

Reflections and Recommendations

(1) The IAC congratulates all those involved in SUPA for a really outstanding year of achievement in all areas of the SUPA scientific programme. The presentations by the theme leaders of the science programme illustrated vividly how far the programme had developed and advanced since the inception of the SUPA programme ten years ago. The programme had evolved constructively and creatively since the programme of themes was initiated.

(2) Further congratulations are in order for the outstanding performance of the SUPA Universities in the 2014 Research Excellence Framework (REF). In so far as the REF mechanism provides an objective assessment of the quality of the UK research, there has undoubtedly been an increase in the quality of physics in the SUPA universities since the 2008 RAE, the Universities of Strathclyde and the joint Edinburgh-St. Andrews successes being particularly noteworthy.

(3) We strongly welcome the statement that the Board of Directors regards SUPA as a permanent feature of Scottish Physics. The benefits of inter-University collaboration have been fully realised in bringing Scottish Physics to a level of the best physics endeavours in the UK and attracting strong international recognition. We reaffirm the opinion

expressed at previous IAC meetings that the investment in SUPA has and will increase the quality of research in Scotland.

(4) We also reaffirm the importance of interdisciplinary research as a means of expanding the reach of physics research. Some of us define physics as 'what Physicists do', the proof of this definition being the many remarkable developments at the interfaces between physics and cognate disciplines such as chemistry, biology, materials, clinical medicine and so on. A strategic problem for Physics Departments is the dilution of the impact of interdisciplinary research because of the procedures adopted by the RAE, REF and its successor. Those in a position to influence HEFCE thinking on REF criteria should endeavour to find the means of giving full credit to the physics departments which participate in interdisciplinary research programmes.

(5) We feel strongly that, while the level of inter- and intradepartmental collaborations has been very positive, there is considerably more that could be done to improve mutually beneficial collaborations. To take just one instance, we were impressed by the strength of Solar Physics and Astronomical research in St. Andrews and strongly encourage collaborative activities between the two separate Departments. We encourage the SUPA executive to investigate proactively further possibilities for constructive collaboration, both within the partner Universities and between them.

(6) Knowledge Exchange has always been a difficult component of the SUPA programme. The changes which have been implemented over the last year go a long way to making knowledge exchange and engagement with Scottish industry a stronger part of the programme. We welcome these developments. A further means of enhancing the KE programme is through the EPSRC Impact Acceleration Accounts programme which seems ideally matched to KE which can inform near-term developments.

(7) A more general issue about developing stronger links with industry concerns the attitude of students, both undergraduates and postgraduates to industrial research. It is a fact that about 50-60% of our undergraduate and graduate student output end up in their final career destinations in some form of industrial or industrial-related activity. The number of physics and astronomy students who end up in academic positions is about 20%. Furthermore, there is a lack of understanding of the quality of research being carried out in industry. In our experience, it comes as a surprise to many graduate students to find out just how good the research performed by industry actually is.

(8) In our view, much more prominence should be given to these topics throughout the undergraduate and graduate teaching programmes. The provision of well-trained students with a positive view of the opportunities offered by industrial research seems to us to be one of the most important contributions of SUPA to KE. The Centres for Doctoral Training (CDTs) have an important role in encouraging a broad-based appreciation of industrially important research topics.

(9) Education and outreach are essential aspects of the SUPA programme and we were pleased to learn of the initiatives being undertaken. We welcome the proposal of the CEO that this be developed into a SUPA theme. We look forward to a specific proposal from the Executive Committee with the endorsement of the Board of Directors. The manpower and operations costs need to be scrutinised to establish a realistic cost of such an initiative falling on the stretched SUPA central budget in the coming years.

(10) Although not the responsibility of SUPA, a number of eyebrows were raised about the proposed content of the new 'highers' syllabus in Physics. The concern is that, while topics such as general relativity, the Standard Model and so on are inspiring topics for school children, the treatment must necessarily be superficial. While inspiration is important, the pedagogical importance of experiment, hypothesis, confrontation of theory with experiment and problem solving should form the core of teaching physics. Plenty of intriguing examples are possible to catch the imagination of young people. The danger is that the superficial treatment of advanced topics may drive the brighter students towards mathematics where they believe they are being exposed to more rigorous quantitative science.

(11) There was a serious concern about the lack of representation of women among the theme leaders and presenters at the meeting. This is not acceptable and sends the wrong message to the many excellent women at all levels in the SUPA community and to young women. We ask the incoming Chief Executive to address this issue with urgency.

Malcolm Longair, on behalf of the SUPA IAC.

17April 2015

Annex 1

SUPA INTERNATIONAL ADVISORY COMMITTEE

MEMBERSHIP

- Prof Malcolm Longair (University of Cambridge) Chair of SUPA IAC
- Dr Eugene Arthurs (SPIE)
- Dr Allan Colquhoun (Selex ES)
- Prof Rolf Dieter-Heuer (CERN)
- Dr Stuart Fancey (SFC)
- Dr Ana Gallardo (Scottish Enterprise)
- Prof Helen Gleeson (University of Manchester)
- Prof Ruth Gregory (Durham University)
- Prof Mike Gunn (University of Birmingham)
- Prof Paul Hagan (SFC)
- Dr John Hand (EPSRC)
- Prof Walter Henning (Argonne National Laboratory)
- Prof David Miller (Stanford University)
- Prof Ian Ritchie (Coppertop)
- Prof Wolfgang Sandner (ELI-DC International Association AISBL)
- Prof Anneila Sargent (Caltech)
- Dr Colin Zimmerman (NNL)

Annex 2

INTERNATIONAL ADVISORY COMMITTEE MEETING
Gateway Boardroom, University of St Andrews
Thursday 26 March 2015

Meeting of IAC with BoD, EC, CEO, Training & Impact (GS & KT)

09:00 ***Registration - Tea/Coffee***

09:30 **Welcome**: Jim Hough

09:35 **Introduction**: Malcolm Longair

09:45 **Progress of the Collaboration**: Jim Hough

10:05 **Training and Impact Progress**: Mat Wasley & Avril Manners

10:35 **Education and Outreach**: Victoria Martin

10:55 ***Coffee***

11:10 **Development of a Forward Strategy for SUPA**: Alan Miller

11:30 **Closed Session**

12:30 ***Lunch***

13:00 **Feedback from the EC, BoD & IAC to the CEO**

14:00 **Close of Meeting**

Annex 3

Scottish Universities Physics Alliance
Annual Meeting
Physics & Astronomy, University of St Andrews
Wednesday 25 March 2015

09:00	**IAC Members Registration and Welcome Meeting** Tea, Coffee and Pastries, Room 233
09:45	**Welcome and Opening Address**: Prof Jim Hough, SUPA CEO, Lecture Theatre A
	SUPA Theme Presentations, Lecture Theatre A
10:00	**Astronomy and Space Sciences**: Prof Ian Bonnell
10:20	**Condensed Matter & Materials Physics**: Dr Brendon Lovett
10:40	**Energy**: Prof Paul McKenna
11:00	Tea, Coffee and Refreshments, Foyer
	SUPA Theme Presentations, Lecture Theatre A
11:15	**Nuclear and Plasma Physics**: Prof Dino Jaroszynski
11:35	**Physics and Life Sciences**: Prof Timothy Newman
11:55	**Photonics** – Dr Keith Mathieson
12:15	**Particle Physics** – Prof Paul Soler
12:35	Lunch, Foyer
13:45	**SUPA Video Clip Competition,** Lecture Theatre A
14:45	**Talk: International Year of Light 2015** Keynote Speaker: Prof Wilson Sibbett, Lecture Theatre A
15:45	**Closing Address**
16:00	Cheese and Wine Reception, Foyer
18:00	Pre-Dinner Drinks at Rusacks Hotel, followed by IAC Dinner in the Rocco Restaurant