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## Management Board meeting #7

### Director's report

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#### Centre development

##### Administration:

- [Bimonthly progress reports](#) since the MB last met:
  - [June](#);
  - [April](#);
  - [February](#).
- [Annual reports](#):
  - Anticipate requirement to submit next annual report at the start of November 2020.

##### Collaboration:

- **CCAP:**
  - Imperial CRUK Cancer Centre:
    - \* Prof. Iain McNeish will replace Prof. Charles Coombes on the CCAP MB.
    - \* CC was instrumental in setting up the CCAP and in providing vision and guidance as the work of the Centre got underway. He has continued to provide support and guidance throughout the Centre's existence. I thank CC for all the support and input and look forward to continued collaboration going forward.
  - Institute for Cancer Research:
    - \* John Yarnold has tendered his resignation from the CCAP MB.
    - \* Discussion is underway with K. Harrington and U. Oelfke to identify his successor.
    - \* JY has made substantial contributions to the development of the Centre's programme introducing "FLASH" and providing incisive clinical insight. I would like to thank JY for all the contributions he has made and look forward to continued productive collaboration.
  - John Adams Institute:
    - \* Prof. Philip Burrows appointed Director from June 2020.
    - \* The HEP Group at Imperial joined the Imperial Physics Laser/Plasma group in the recent JAI proposal for continuation of the Consolidated Grant that supports the work of the Institute. Resources to pursue work on LhARA were included in the bid. The review of the proposal is underway.
  - Oxford Institute of Radiation Oncology:
    - \* New Director, Prof. Amato Giacca, appointed January 2020.
    - \* Prof. Giacca will replace Prof. Boris Vojnavic on the CCAP MB.
    - \* I would like to thank BV for the contributions that he made to the development of the Centre's activities, especially in the early formative period.
- **External-existing:**
  - MedAustron, Medical University of Vienna, and Technical University of Vienna:
    - \* Graduate student, H.T. Lau, who was in residence at MedAustron, is now back at Imperial.

- \* The development of the SmartPhantom real-time dose-measurement device has stalled owing to the outbreak of Covid-19.
- \* Good relationships with MUW and TUW have been maintained through the development of the LhARA programme.
- \* Work to recover the former collaboration will need to be considered when hardware work can restart.
- CERN:
  - \* A graduate student has been recruited into the CCAP programme through the CERN Doctoral Student programme (Oct20 start). The student will contribute to the study of slow extraction from the synchrotron ring proposed for the South Eastern European International Institute for Sustainable Technologies ([SEEIIST](#)).
- CERN/STFC: Development of “Smart Technologies to Extend Lives with a Linear Accelerator (STELLA)”:
- \* Development continues in the context of the JAI.
- **Under development:**
  - International Biophysics Collaboration (IBC):
    - \* Resources for networking secured through the successful bid to the STFC Opportunities 2019 call. Networking activities have slowed due to Covid-19.
  - STFC ISIS and Particle Physics Departments:
    - \* Strong collaborations established through the development of LhARA and the associated instrumentation.

### Staff:

- At previous MB meetings the ongoing discussion of two complementary lecturer positions:
  - Lecturer in novel particle radiobiology (FoM/Dept. of Surgery and Cancer); and
  - Lecturer in biophysics (FoNS/Physics);
 were discussed. Part of the case for these positions was based on 50% funding for both posts thought to be available from the Gunnar Nielsson Trust.
 

While the academic case for these positions remains strong, the discussion has stalled both because of the absence of contact with the Gunnar Nielsson Trust and financial pressures on the Department of Physics and Division of Cancer.
- Imperial’s new [Academic strategy](#) emphasises the importance of cross-cutting, multidisciplinary research that leverages core scientific competences. LhARA, the Laser-hybrid Accelerator for Radiobiological Applications, has gained support in the context of the development of the Academic Strategy.

### Outreach:

Since the MB last met:

- **Conference presentations:**

Abstracts were submitted as follows:

  1. H.T. Lau, IoP: Joint Joint APP, HEPP and NP Conference (HEPP20), 6-9 April 2020, University of Edinburgh, UK, “*Design of Laser-hybrid Accelerator for Radiobiological Applications (LhARA)*”
  2. J. Pasternak, 14<sup>th</sup> International Topical Meeting on Nuclear Applications of Accelerators (AC-CAPP20), 5–9 April 2020, Vienna, Austria, “*LhARA - Laser Hybrid Accelerator for Radiobiological Applications – the facility for precision radiobiology*”

3. J. Pasternak, 11<sup>th</sup> International Particle Accelerator Conference (IPAC20), 10-15 May 2020, Ganil, Caen, France, "[Conceptual Design for LhARA - Laser-hybrid Accelerator for Radiobiological Applications](#)"
4. K. Long, 59<sup>th</sup> Annual Conference of the Particle Therapy Co-operative Group (PTCOG59), 9-14 May 2020, Taipei, Taiwan, "[The Laser-hybrid Accelerator for Radiobiological Applications \(LhARA\)](#)"
5. K. Long, Beam Line and INstrumentation: Fourth Workshop (BLIN4), online, Ludwig-Maximilians-Universität, München, Germany, 29 June 2020, "[The Laser-hybrid Accelerator for Radiobiological Applications \(LhARA\)](#)"
6. K. Long, 40<sup>th</sup> International Conference on High Energy Physics (ICHEP20), 30 July-5 August 2020, Prague, Czech Republic, "[The Laser-hybrid Accelerator for Radiobiological Applications \(LhARA\)](#)"

All abstracts were accepted. The IoP conference (abstract 1) was cancelled and the ACCAPP workshop was postponed (abstract 2). Only invited talks were presented at IPAC, therefore the contribution (abstract 3) was not made. PTCOG (abstract 4) has been postponed. BLIN4 and ICHEP (abstracts 4 and 5) will run as a virtual conference, the contributions will be made.

- **Seminars:**

- 19Feb20; Blackett: Graeme Burt (Lancaster/CI), "[Side coupled Medical Linac development at Lancaster University](#)"

- **External seminars:**

- K. Long: 17Jan20, "The Laser-hybrid Accelerator for Radiobiological Applications, LhARA"; seminar presented to the Machine Division, DESY, Hamburg;
- K. Long: 22Jan20, "LhARA; a step on the way to precision particle-beam therapy"; colloquium presented at DESY, Zeuthen, Berlin;
- K. Long: 11Feb20, "Centre for the Clinical Application of Particles"; presented at the Public Patient Involvement meeting at Maggies, the Charing Cross Hospital, London.

In addition T. Greenshaw (Liverpool) presented "Laser-hybrid accelerator for radiobiology (LhARA)" in a seminar presented at Birmingham University. This contact led to Birmingham joining the LhARA consortium (see below).

Possible speakers to be contacted by A. Kurup to fill seminar slots in the next academic year include:

- Anna Barnett (Sussex): novel technology development;
- Paul Beard (UCL): Photo-acoustic imaging;
- Marco Borghesi (Queens, Belfast): Laser-plasma interactions and ion sources for bio/medical applications.
- Manjit Dosanjh (CERN): radiotherapy and related research;
- Ross Gray (Strathclyde): Laser-plasma interactions and ion sources;
- Mike Merchant (Manchester): Modelling of impact of ionising radiation on tissue;
- Amy Chadwick (Manchester): Radiobiology of proton and ion beams (possibility for presentation at ICR, Fulham Road);
- Giuseppe Schettino (NPL/Surrey): novel dosimetry; and
- Suzy Sheehy (JAI, Oxford and Melbourne): Medical accelerators.

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## LhARA; the Laser-hybrid Accelerator for Radiobiological Applications

### pre-CDR:

- The modest resources provided by the STFC Opportunities 2019 award together with additional resources “leveraged” from the consortium were used to deliver the LhARA “pre-CDR”:
  - [Pre-CDR](#) completed (on schedule) by April 2020;
  - The pre-CDR was [reviewed favourably by an international panel](#) on the 25<sup>th</sup> and 31<sup>st</sup> March 2020. This international review is peer endorsement subsequent to the 2019 review by STFC PPRP carried out as part of the Opportunities 2019 process.
  - A [publication](#) based on the pre-CDR has been prepared and submitted to Frontiers in Physics Medical and Imaging. The preprint has been uploaded to the arXiv as [arXiv:2006.00493](#).

### Building on the pre-CDR:

- The Opportunities award created momentum. Since completion of pre-CDR, the following groups have joined the consortium:
  - The National Physical Laboratory;
  - Surrey;
  - Birmingham:
    - \* School of Physics and Astronomy;
    - \* University Hospitals Birmingham NHS Foundation Trust;
    - \* Birmingham Cyclotron Facility;
    - \* Positron Imaging Centre at the University of Birmingham;
  - Institut Curie (Paris).
- **Now planning proposal to new EPSRC Transformative Healthcare Technologies call**  
Link: [Second Call for Transformative Healthcare Technologies–Pre-announcement and engagement event](#)

### Rosalind Franklin Institute:

- *“The Rosalind Franklin Institute is dedicated to transforming life science through interdisciplinary research and technology development”.*
  - Discussions with the RFI were initiated by P. French (Imperial, Physics and FONS Vice Dean for Research).
  - Discussions with Prof. J. Naismith, Director of the RFI continue.
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## Funding

### Record of applications:

Title	Funder	Lead	Value (£k)	Submission Date	Interview Date	Decision Date	(£k)	Allocation	
								Start	End
STFC IAA	STFC	Long	25.19	Jul-20	N/A	Oct-20			
JAI consolidated grant	STFC	Najmudin	200.00	19-Mar-20	Jun-20				
CNRS-Imperial	Imperial	Long	70.00	16-Jan-20	N/A	Y Apr-20	70.00	Oct-20	Sep-23
EU MCSA ITN	EU	Dosanjh	70.00	04-Jan-20	N/A	N			
CERN Graduate Programme	CERN	Long	70.00	-	N/A	Y Apr-20	111.23	Oct-20	Mar-24
Imperial-CNRS joint PhD programme	Imperial (?)	KL	140.00	17-Jan-20	N/A				
STFC Earnest Rutherford Fellowship	STFC	CH	622.01	26-Jun-19					
Opportunities 2019	STFC	KL	139.35	13-Jun-19	N/A	Aug-19	139.35	01-Oct-19	30-Sep-21
Clinical Academic Research Partnerships March 2019	MRC	DG	188.78	17-Jun-19	N/A				
Contribution from HEP group for a high-spec server	HEP	AK	7.00			Y	7.00		
Distributed, precise and personalised, particle-beam therapy for 2050	EPSRC	KL	6,983.30	02-May-19		N 15-Jun-19			
The SmartPhantom – A beam profile and dose measuring device	STFC/IAA	AK	35.00	09-May-19	N/A	Y 05-Jun-19	37.66	Jul-19	31-Mar-20
Class of 64 Scholarship	Imperial	KL	63.81	04-Mar-19	N/A	Y 03-Apr-19	63.81	Oct-19	Sep-22
Clinical Academic Research Partnerships March 2019	MRC	DG	142.91	09-Mar-19	N/A	N			
Sol to ASB	STFC	KL	302.35	25-Feb-19	N/A	N			
STFC Exploration award	STFC	KL	20.00	24-Jan-19	N/A				
STFC CG capital award	STFC	KL	18.73	Aug-18	N/A	Y 23-Oct-18	18.73		
STFC CASE studentship CCAP/Maxeler	Imperial	DG/RMcC/KL	80.77	04-Oct-18	N/A	N 20-Dec-18			
Imperial College Research Fellowship	Imperial	CH	302.10	28-Aug-18	N/A	N Oct-18			
STFC IAA	STFC/IAA	AK	20.00	29-Jun-18	N/A	Y Jan-18	52.14	Sep-18	Jan-19
STFC quota studentship via IC HEP	STFC	KL	70.00	Nov-17	N/A	Y Dec-18	70.00	01-Oct-18	Jun-22
Laser-driven ion beams for radiobiology and treatment	CRUK	KL, MW	498.35	24-Jan-18	N/A	X 25-Apr-18			
Building a European Network for the development of novel techniques for radiobiology and particle therapy	Imperial	VB	5.00	23-Jan-18	N/A	Y 22-Feb-18	5.00	01-Mar-18	29-Feb-20
Laser-driven ion beams for radiobiology	RoseTrees Trust	KL, MW	251.46	01-Dec-17	N/A	X			
Ultra-fast prompt photon imaging for proton beam therapy	Imperial	KL, AK, DC, DG	250.00	24-Nov-17	21-Feb-18	X			
Opportunity: recruitment of PhD student to carry out research in accelerator-based radiobiology in collaboration with MedAustron	Imperial	KL	70.00	21-Nov-17	N/A				
Development of a programme for the measurement of the radio-biological effectiveness of charged particle beams	CRUK IC	KL/MW	70.00	19-Mar-17	N/A	X			
Development of a programme to investigate the biological foundations of charged-particle therapy	CRCE	KL/MW	29.83	31-Mar-17	N/A	X 05-May-17			

Period	Value (£k)	Award (£k)	Success rate	Corrected success rate
Oct16-Sep17:	99.83	0.00	0.00%	0.00%
Oct17-Sep18:	1,466.91	127.14	8.67%	8.67%
Oct18-Sep19:	8,644.51	247.81	2.87%	14.92%
Oct19-Sep20:	575.19	181.23	31.51%	31.51%
All:	10,745.95	574.91	5.35%	15.28%

### Comments:

- Success in recruiting students into programme; 2 will start October 2020.
- EPSRC Transformative Healthcare Technologies bid now a critical priority. **Need MB support to lay the foundations for this to be a success.**
- EPSRC Healthcare rolling call: need to follow through on development of proposal to this call.
- With I. McNeish plan to target CRUK Imperial Centre collaborative studentship call.

## Undergraduate teaching

### Development of undergraduate teaching related to CCAP programme:

- A meeting with relevant teaching staff in Physics was held in September 2019. Little progress since.

- Target academic year is 2021/22 or 2022/23 as the curriculum of the third and fourth years will be reviewed on this timescale.
  - Propose to continue to pursue an enhanced set of biomedical set options. Seek to include expertise at ICR (U/ Oelfke) and CXH (C. Hardiman) in this activity.
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## **Business plan**

### **Agenda item:**

- Not yet complete. Two themes now established or becoming established:
    - LhARA; and
    - Radiobiology:
      - \* Including novel instrumentation, simulation, data processing;
      - \* Led in LhARA context by J. Parsons (Liverpool).
  - Third theme: “imaging, instrumentation, and dosimetry”. Intention is that discussion at plenary meeting later today will begin to make this theme more concrete.
  - Will continue to work towards Business plan and development of:
    - Governing Board; and
    - International Advisory Board.
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