

---

## Management Board meeting #4

### Director's report

---

#### Centre development

##### Administration:

- Bimonthly progress reports (see <https://ccap.hep.ph.ic.ac.uk/trac/wiki/Governance/ManagementBoard/Reports/Bimonthly>):
  - February, April and October.
  - June report was not submitted.
- Annual report: (see <https://ccap.hep.ph.ic.ac.uk/trac/wiki/Governance/ManagementBoard/Reports/Annual>).

##### Collaboration:

- **CCAP:**
  - OIRO:
    - \* Last MB (18Jul18) I reported that OIRO had entered a period of uncertainty due to CRUK decisions regarding distribution of resources for radiotherapy-related research and the search for a new Director;
    - \* At that time the future direction of OIRO in the areas that the CCAP seeks to develop was unclear. We agreed to invite Frank van den Heuvel to the MB;
    - \* Further discussion with FvdH indicates that there are opportunities for collaboration in the study of the biological/clinical impact of particles other than protons;
    - \* FvdH is attending this MB meeting to continue/broaden the discussion.
  - Automating of on-treatment verification of CBCT to facilitate fast and accurate adaptive radiotherapy:
    - \* STFC CASE student application: CXH, Imperial Physics with Maxeler Technologies.
  - High-dose-rate/high-energy electron/electron-microbeam radiotherapy:
    - \* J. Yarnold and U. Oelfke initiated discussion of use of high-dose-rate and micro-beam electrons. C. Hardiman and R. McClaughlan (CXH) identified possibility of re-purposing of one of two electron-linac radiotherapy machines for research;
    - \* In parallel contact was made with Massimo Noro, Head of Campus Development at the Daresbury Laboratory (DL) to explore the possibility of use of DL electron machines for high-energy irradiations;
    - \* Discussion of requirements and opportunities will take place at this afternoon's plenary meeting;
    - \* Excellent opportunity for collaboration within, and beyond, CCAP institutes.
- **External-existing:**
  - MedAustron:

- \* Graduate student, H.T. Lau, in residence at MedAustron. Has contributed to carbon-ion beam-line commissioning. He introduced BDSim (Geant4-based code) because it can do scattering in passive materials and handle magnetic-field maps. Demonstrated simulation inconsistent with instrumentation, which caused commissioning team to measure emittance in synchrotron which was a factor of three larger than expected—a significant contribution from HT!
- \* Agreed that HT will transition to 50% carbon-ion-beam commissioning and 50% development of ‘SmartPhantom’ and contribution to radiobiology programme with the Medical University of Vienna (MUW);
- \* Meeting at MedAustron 12Nov18 to agree next steps.
- **External–new:**
  - STFC Daresbury Laboratory: use of electron beams:
    - \* Possible use of electron beams at DL noted above;
    - \* Agreed to co-organise a meeting in February 2019 to discuss research needs, the potential of beams at the DL, and how to move forward;
    - \* Organisers: M. Noro, J. Yarnold, KL.
  - CERN: PIMMS2:
    - \* PIMMS (Proton-Ion Medical Machine Study) produced design for CNAO and MedAustron;
    - \* M. Vretenar (CERN) asked by CERN management to consider development of PIMMS2: more compact/less expensive linac or synchrotron for delivery of proton and ion beams. Balkan states seek resources from EU to build treatment/research facility. Design Study to produce design for them. Constraint; ‘can be built in five-years time’;
    - \* One meeting held close to CERN (KL attended). Believe there is agreement to include novel (laser-driven) beams in the study. Work by CERN and Balkan states behind the scenes to prepare EU/ESFRI for forthcoming Design Study bid;
    - \* Informal: MV indicated that he would like CCAP to look at the front-end of the beam, up to  $\sim 10$  MeV. Ideal! Will allow us to contribute to PIMMS2 study and continue to develop our own ideas;
    - \* CCAP members (Kurup, Long, Pasternak, Pozimski) will visit CERN on 13/14 November 2018 to discuss collaboration with A. Lombardi (PIMMS2 co-lead). Principal goals for this meeting:
      - Agreement on areas of collaboration in preparation for PIMMS2 design-study proposal; and
      - Agreement on CERN Doctoral Student to be recruited into the programme through Imperial Physics HEP.
    - \* MV will give seminar in CCAP series in Blackett on 12Dec18. Opportunities for further discussion.
  - CERN/STFC: Development of medical-linac based X-ray treatment facility for challenging environments:
    - \* Opportunities for CCAP:
      - Physics: Electronics, fast feedback and control;
      - Engineering: image processing, control, systems engineering, failure mode analysis.
    - \* 3 colleagues from the Dyson School of Engineering Design are interested in the aspects above. Working towards a meeting with the project leader and the STFC lead on the initiative.
  - GSI: Radiobiology and related instrumentation development:
    - \* KL invited to GSI by M. Durante for seminar and discussion on collaboration (13Dec18);
    - \* In discussion, and in email exchange, MD indicated willingness to fund CCAP student to create CCAP/GSI collaboration so long as student is resident at GSI;
    - \* Discussion of how this can go forward an important goal for the discussions at GSI.

• **Under discussion:**

- CRUK Radiation Research Network (Cancer Research UK RadNet) Centres of Excellence:
  - \* J. Meredith in contact with K. Harrington, U. Oelfke et al to discuss how a bid to this call might go forward;
  - \* Well aligned with CCAP ambitions, so, very much in our interest to support and be involved;
  - \* Hub and spoke model: can CCAP be the ‘spoke that links’ putative ICR/Imperial and Oxford bids?
- STFC ISIS and Particle Physics Departments:
  - \* Previously reported preparation of MoU with STFC ISIS to support collaboration on accelerator-science aspects of CCAP programme;
  - \* Previous MoU supports a number of joint Imperial/STFC appointments;
  - \* KL and J. Thomason have prepared a draft MoU that has been accepted by the legal department at the Rutherford Appleton Laboratory (RAL). KL/JT will meet tomorrow to agree next steps; presumably discussion with contracts at IC;
  - \* New Director of PPD (Dave Newbold) seeks to establish stronger links with University groups in area of instrumentation/detector development. Opportunity. Considering broadening MoU to allow possible joint Imperial/PPD appointments to be negotiated under its umbrella;
- John Adams Institute:
  - \* KL met P. Burrows, acting director of the JAI, to discuss the possibility that Imperial HEP would formally join the JAI. Already collaborating closely with JAI on a number of projects. CCAP programme joint with ZN laser-acceleration programme which is carried out in collaboration with S. Hooker at JAI/Oxford;
  - \* Agreed to pursue concept of closer relationship JAI/IC-HEP and to seek additional resources from STFC to make this happen.

**Staff:**

- Discussions continue, led by I. McNeish (HoD Surgery and Cancer) and M. Dougherty (HoD Physics), with a view to creating two lecturer positions:
    - Lecturer in novel particle radiobiology (FoM/Dept. of Surgery and Cancer) with an interest in the development of a fundamental understanding of the radiobiology of novel particle beams and the application of this knowledge to improve clinical practice; and
    - Lecturer in biophysics (FoNS/Physics) with an interest in the measurement, characterisation and modelling of the biological impact of particle beams.
- 50% funding for both posts remains on the table from the Gunnar Nielsson Trust;
- Joint support for Centre Manager post remains agreed in principle. Urgent now to put financial details on a proper footing.

**Towards a Centre ‘routine’:**

- CCAP seminar series initiated.
- Next: M. Vretenar (CERN), 12Dec 2018.
- Winter term, invitations out to:
  - K. Kirkby (Manchester);
  - Paul McKenna (Strathclyde);
  - Chris Phillips (Imperial);
  - Graeme Burt (Cockcroft/Lancaster)

- So far all seminars have been in the Blackett Laboratory. It would be good to host some at CXH, ICR, OIRO, and JAI.

## Funding

### Record of applications:

Title	Directory	Funder	Lead	Value (£k)	Submission Date	Interview Date	Decision Date	Allocation			
								(£k)	Start	End	
STFC CG capital award	2018-06-07-STFC-capital	STFC	KL	18.73	Aug-18	N/A	Y	23-Oct-18	18.73		
STFC CASE studentship CCAP/Maxeler	2018-10-04-STFC-CASE	Imperial	DG/RMcC/KL	80.77	04-Oct-18	N/A					
Imperial College Research Fellowship	2018-08-28-ICRF-Hunt	Imperial	CH	302.10	28-Aug-18	N/A	N	Oct-18			
STFC IAA	2018-06-29-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	2018-01-CRUK-MDPA	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	2018-01-23-EU-Prtnrs-Trvl	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	2017-11-Rosetrees-Trust	RoseTrees Trust	KL, MW	251.46	01-Dec-17	N/A	X				
Ultra-fast prompt photon imaging for proton beam therapy	2017-11-24-EFFR	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	2017-10-30-PhD	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	2017-03-CRUK-Ctr-PG-bid	CRUK IC	KL/MW	70.00	19-Mar-16	N/A	X				
Development of a programme to investigate the biological foundations of charged-particle therapy	2017-03-31-CRCE-30k	CRCE	KL/MW	29.83	31-Mar-17	N/A	X	05-May-17			
				<b>Total</b>	<b>1,666.25</b>			<b>Total</b>	<b>145.87</b>		

Success rate: 8.75%

### Comments:

- Business Plan (agenda item) now a priority;
- ERC Advanced Grant application–withdrawn:
  - Radiobiology facility ‘Phase I’;
    - \* Failed to find scope that was simultaneously sufficiently novel/ground-breaking and would fit within the budget;
    - \* Secondary gains (a costed project plan) and Imperial ‘buy in’ achieved:
      - Laser Accelerator for Radiobiological Applications (LARA):
      - Presented by A. Kurup at the ‘Third Geant4 International User Conference at the Physics-Medicine-Biology frontier’, see: <https://ccap.hep.ph.ic.ac.uk/trac/wiki/Communication/Conferences/2018/10-29-Geant4-2018>.
- Near term targets:
  - C. Hunt (post-doc, Imperial HEP) will apply for EPSRC Discipline-hopping Award to work with R. McLaughlan et al at the CXH;
  - STFC Impact networks (K. Hollinshead (STFC) will be at today’s plenary meeting);
  - EPSRC Healthcare Call, Gabor Lens and physical-science elements of radiobiology programme;
  - EPSRC Physics of Life call: not yet announced, but, have prepared a proto-bid for a ‘SmartPhantom’ to be deployed at MedAustron;
  - Graduate students through CERN Doctoral Programme and GSI. Also an opportunity through HEP Group PhD quota awards (less likely this year as we have a student in place);
  - Should we seek representation at the sandpit advertised at <https://www.cancerresearchuk.org/funding-for-researchers/our-funding-schemes/early-detection-innovation-sandpit-and-award>;
- Medium term:
  - EU Design Study call lead by CERN on PIMMS2.
- Long term:

- Begun discussions with Imperial European Office of a Synergy Grant proposal (deadline, assumed, Nov19);
- Strategic Priority Fund: with STFC Programmes Directorate and DL;
- EPSRC Physics of Life call: not yet announced, but, have prepared a proto-bid for a ‘SmartPhantom’ to be deployed at MedAustron.

### **Links with industry:**

- Through STFC IAA grant secured by A. Kurup, we shall be organising an ‘industry-awareness’ event in the new year;
  - Hamamatsu keen to work with us on development of prompt-photon imaging.
- 

### **Politics; building the case**

#### **UK-wide business case for interdisciplinary non-clinical radiobiological/systems-based radiotherapy research:**

- Phone call: M. Noro, K. Kirkby, I. McNeish and KL. A. Chalmers unavailable.
  - Outcome: KL and MN to draft a programme to be offered as a community document and, with modifications, as i/p to the Strategic Priorities Fund.
  - MN was to attend the plenary this afternoon, but has had to change his plans;
  - I will seek an early opportunity to meet with him to take this forward.
- 

### **Business plan**

#### **Agenda item; now urgent.**

- Seek to complete in calendar 2018;
  - Previously agreed to use completion of Business Plan to trigger establishment and first meetings/activity of:
    - Governing Board;
    - International Advisory Board;
  - Perhaps also consider ‘consortium agreement’ when Business Plan is complete.
-