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## Centre for the Clinical Application of Partices; activity report September 2019

This report covers the period from 20<sup>th</sup> May 2019. As usual the report includes two key aspects of the Centre's activities over the reporting period.

### 1 Proposals

The Centre's outline proposal to the EPSRC Transformative Healthcare Technologies 2050 call was declined. The previous report contains an outline of the proposal, which would have provided the resources for the first steps in the development of the Laser-hybrid Accelerator for Radiobiological Applications (LhARA). The EPSRC feedback was "*Engagement with patients, clinicians and industry could have been strengthened.*" A future Case for Support will articulate more clearly the strength of CCAP's clinical and industrial engagement. The absence of patient engagement in the development of the Centre's activities is a valid and substantive criticism; steps are being taken to address this.

Centre personnel have made a number of applications for resources, one new grant (STFC Opportunities 2019) has been awarded:

*STFC Opportunities 2019:*

£140k over two years has been awarded to:

1. Deliver an outline CDR for the LhARA;
2. Establish a test-bed for advanced technologies for radiobiology and clinical radiotherapy at the Clatterbridge Cancer Centre (CCC); and
3. Create a broad, multi-disciplinary UK coalition, working within the International Biophysics Collaboration (IBC) to place the UK in pole position to contribute to and to benefit from this exciting new biomedical science-and-innovation initiative.

The bulk of the resources must be spent between October 2019 and March 2020.

The proposal was led jointly from Imperial Physics and Liverpool Biology. The composition of the consortium is:

- Academic institutions:
  - *Imperial*: CCAP, Departments of Physics and Computing;
  - *Liverpool*: Department of Physics, Institute of Translational Medicine (Department of Molecular and Clinical Cancer Medicine);
  - *Manchester*: Division of Cancer Sciences;
  - *Belfast*: Centre for Plasma Physics (Department of Physics), Centre for Cancer Research and Cell Biology;
  - *Strathclyde*: Department of Physics; and
  - *Royal Holloway University of London*: Department of Physics.
- Accelerator centres:
  - John Adams Institute; and
  - Cockcroft Institute.
- Laboratories:
  - Accelerator Science and Technology Centre and STFC Daresbury Laboratory, Warrington;
  - Central Laser Facility, STFC Rutherford Appleton Laboratory, Harwell; and
  - ISIS Department, STFC Rutherford Laboratory, Harwell.

- Clinical departments:
  - Department of Oncology, Imperial College Healthcare NHS Trust, Charing Cross Hospital, London;
  - Radiotherapy Department, Imperial College Healthcare NHS Trust, Charing Cross Hospital, London; and
  - Division of Cancer Sciences, The Christie Hospital, Manchester.
- Industrial partners:
  - Leo Cancer Care;
  - Maxeler Technologies, Ltd.; and
  - Corerain Technologies.

*Clinical Academic Research Partnerships:*

D. Gujral, a consultant clinical oncologist at the Charing Cross Hospital, requested a CARP fellowship to develop novel image-processing techniques to enable adaptive radiotherapy. The award would provide three-years of funding. If successful Dr. Gujral will be hosted in the Imperial Department of Physics.

## 2 Publications and conference contributions

Over the reporting period the Centre’s first paper in a refereed journal has been published:

- A. Kurup et al.: “*Simulation of a radiobiology facility for the Centre for the Clinical Application of Particles*”, *Physica Medica: European Journal of Medical Physics*, Volume 65, 21–28 <sup>1</sup>, arXiv:1907.10157.

Conference presentations:

- C. Hunt: 20May19; IPAC, Melbourne, “*The LhARA Radiobiology Facility for the Centre for the Clinical Application of Particles*”;
- K. Long: 21May19; 1<sup>st</sup> meeting of the IBC, “*Laser-hybrid Accelerator for Radiobiological Applications*”

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<sup>1</sup>[https://www.physicamedica.com/article/S1120-1797\(19\)30156-5/fulltext](https://www.physicamedica.com/article/S1120-1797(19)30156-5/fulltext)