

## Management Board meeting #9

### Director's report

#### Centre development

##### Administration:

- Bimonthly progress reports since the MB last met:

- June
- May
- April
- February

- Annual reports:

Reporting framework has been revised. Annual reports are no longer required, the arrangements going forward are:

- **Frequency:** Multi-faculty networks and centres will now be reviewed once every two years.
- **Format:** Centre progress will be discussed at a biannual review meeting with up to 5 Networks or Centres, respectively, working in the same or complementary topics. Centre activity will be reviewed at the meeting by a panel of two Vice-Deans (Research) chaired by the faculty host Vice-Dean. To facilitate the discussion, Centre leads will be asked to prepare a short progress report on a PowerPoint template to present at their review meeting.

The CCAP has not yet been called upon to report.

#### Collaboration:

##### CCAP:

- Updates from the CCAP members (Faculty of Medicine, the Imperial Academic Health Science Centre, the Imperial College NHS Healthcare Trust, the Department of Physics, the Imperial CRUK Cancer Centre, the Institute of Cancer Research, the John Adams Institute and the Oxford Institute for Radiation Oncology):
  - Institute for Cancer Research:
    - \* Active and growing collaboration with J. Bamber on ion-acoustic imaging as part of the LhARA initiative.
  - John Adams Institute:
    - \* The JAI programme was recently reviewed by the JAI's Advisory Board and its Governing Board. The LhARA initiative was well received by both Boards.

##### External-existing:

- CERN:
  - Discussions are ongoing with a view to stronger collaboration in the development of accelerators for biomedical application.

#### Staff:

- No staff changes since the MB last met.

## **Post-graduate students:**

- Two graduate students have been recruited for a October 2021 start:
  - Josie McGarrigle, joint award with Institut Curie.
  - Maria Maxouti, jointly supported by JAI/Imperial and STFC/PPD.

## **Outreach:**

Since the MB last met:

- **Publications**
  - Anomalous Beam Transport Through Gabor (Plasma) Lens Prototype; T. Nonnenmacher et al., DOI: [doi.org/10.3390/app11104357](https://doi.org/10.3390/app11104357); Preprint: arXiv:2104.05637, 2020
- **Conference contributions:**
  - Jun21: 59th Annual Conference of the Particle Therapy Co-operative Group (PTCOG59), 4-7 June 2021, Online Meeting;  
**T.S. Dascalu on behalf of the LhARA consortium:** "The Laser-hybrid Accelerator for Radiobiological Applications (LhARA)";
  - May21: 12th International Particle Accelerator Conference (IPAC21), 24-28th May 2021, online, Campinas, Brazil;  
**T.S. Dascalu on behalf of the LhARA consortium:** "Second Beam Test and Numerical Investigation of the Imperial College Plasma (Gabor) Lens Prototype";  
**H.T. Lau on behalf of the LhARA consortium:** "Beam Tracking Simulations for Stage 1 of the Laser-hybrid Accelerator for Radiobiological Applications (LhARA)";  
**W. Shields on behalf of the LhARA consortium:** "Simulations of the Stage 2 FFA Injection Line of LhARA for Evaluating Beam Transport Performance";
  - Apr21: Annual Meeting of the IOP Particle Accelerators and Beams Group, 9th of April 2021;  
**C. Whyte on behalf of the LhARA consortium:** "LhARA";
  - Mar21: Annual Radiotherapy and Oncology meeting 2021 (BIR 2021), 18–19 March 2021, online;  
**R. McLauchlan on behalf of the CCAP and the LhARA collaboration:** "The Centre for the Clinical Application of Particles (CCAP): An interdisciplinary collaboration transforming personalised, precision particle-beam therapy of the future";
- **Seminars:**
  - 9 June: Paul Beard (UCL): "Photoacoustic imaging for the clinical and life sciences"
  - 26 May: Marco Borghesi (Queen's University Belfast): "Laser-driven ion acceleration: emerging mechanisms and progress towards biomedical applications"
  - 17 Feb: Francesco Romano (INFN): "Challenges in dosimetry of particle beams with ultra-high pulse dose rates"
- **External seminars and other presentations:**
  - 13May: K. Long, "The Laser-hybrid Accelerator for Radiobiological Applications LhARA"; seminar presented in the UK Accelerator Institutes Seminar series
  - 21May: K. Long, "The Laser-hybrid Accelerator for Radiobiological Applications LhARA"; seminar presented in the CERN HITRI+ seminar series
  - 26May: K.Long, "Proton & ion beams for bio-medical application; the next generation"; presented within the UK government's "Emerging Technologies Radar" meeting series

Possible speakers to be contacted by A. Kurup to fill seminar slots in the coming terms include:

- Anna Barnett (Sussex): novel technology development;
- Manjit Dosanjh (CERN): radiotherapy and related research;

- Ross Gray (Strathclyde): Laser-plasma interactions and ion sources;
  - 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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## Funding

The award supporting the John Adams Institute has been made by STFC. The Centre's activities on LhARA are supported in part through this award.

Work on the development of a proof of principle of the use of the “Serenity” high-throughput computing board for the processing of signals from the novel devices such as the SmartPhantom is supported through the STFC Impact Acceleration Award.

The principle focus since the MB last met has been the development of the case for the ITRF and LhARA through the the STFC Visions Process. This will be reported in the item on LhARA.

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## Undergraduate teaching

### Teaching in Academic Year 2020/21 related to the CCAP programme:

- Nuclear Diagnostics and MRI; one of the 3<sup>rd</sup>/4<sup>th</sup> year medical physics options courses.  
Lecturer/Associate: K. Long/R. McLauchlan  
Remote (online) format allowed significantly enhanced involvement of medical physicists from the Imperial NHS Healthcare Trust. Each week, two live “Question and Application” settings were led by medical physicists. The personnel involved were: Chloe Bowden, Pedro Ferreira, Mary Finnegan, Kuldip Nijran, Neva Patel, Laura Perry, Rebecca Quest, Andrew Scott, and Sonia Vieles-Vallespin. All contributed to the preparation of “active learning” elements and to the preparation of the examination.
- K. Long and J. Bamber, with others, are supervising an MSc student (J. McGarrigle) in her MSc project on the development of a simulation of an ion acoustic proof-of-principle experiment as part of the LhARA programme.

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

- Physics of Medical Imaging and Radiotherapy; new course to run as a 3<sup>rd</sup>/4<sup>th</sup> year option for the first time in the next academic year. The new course consolidates the medical imaging options run in previous years and includes consideration of the biophysics of ionising radiation.

The “Learning and teaching approach” from the course description:

The course is delivered as a series of lectures (12) introducing different imaging modalities and concepts that cut across all of these.

Each week during the lectures, the students will each be assigned a topic that goes beyond the material covered in lectures. They will be given specific material to study on their allocated topic. The following week they will be asked to explain their topic to their peers in small groups during a seminar.

Towards the end of the lectures, the students will work in small groups to prepare a problem sheet-style question with answers on an assigned topic. The questions will then be distributed to the whole class and each group will rank and give feedback on the questions prepared by the other groups.

At the end of the course, the students will work in groups to write a report and give a joint presentation on a topic selected from a list. The groups will each provide an assessment of the presentations given by the other groups.

The structure has been developed to allow increased opportunity to bring the expertise of CCAP institutions outside Imperial Physics to bear, e.g. in the element on the physics of radiotherapy.

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