

Project Title: (Max 8 words) *Physics at the heart of medical science*

Brief summary description of your project:(Max 150 words) Use this space to tell us about your project. It should be clear to someone not involved with the project what you hope to do. Who is your target audience? What will they gain from the engagement? What activities will be involved? *

1 in 2 people in the UK will develop cancer during their lifetime and a significant fraction of those will undergo radiotherapy. We aim to produce a series of podcasts, aimed at the general public, that will explore how physicists, working together with patients, doctors and engineers, have been crucial to the continuing evolution of radiotherapy over the last century. The podcasts will be advertised through existing cancer support networks and through social media to reach a diverse audience. The interactions through social media posts and in-person meetings with the cancer support groups will build relationships with this audience.

The podcasts will benefit from a close association with the recent interdisciplinary research proposal to construct a novel particle therapy research facility in the UK, Laser-hybrid Accelerator for Radiobiological Applications (LhARA), and will communicate the exciting physics research being done that has the potential to improve all our lives.

Tell us about your target audience in more detail. Why and how will your project reach and include this public group?

Tell us about your existing relationships, planned partnership, and targeting work.(Max 250 words) *

Cancer affects people across society, especially lower socioeconomic groups, and so our target audience is very diverse. This community is supported at a local level by hospital groups and health services as well as nationwide charities such as Cancer Research UK (CRUK), Macmillan Cancer Support and Maggie's Centres, and organisations such as The Cancer Vanguard.

As well as providing a community for cancer patients, these services engage with family members, carers and the medical community, and provide information on the diverse array of therapies and new research. We have existing contact with CRUK lead nurses, who coordinate support groups and provide access to the CRUK email newsletter, and members of The Cancer Vanguard. These connections will be used to engage with our target audience: to provide input on the content of the podcasts; to build relationships through social media and in-person meetings; and to disseminate the podcasts.

By using the support networks we can ensure that the target audience is approached in an appropriate way and care will be taken to ensure that information, especially medical information within the podcast, is well evidenced and additional resources, providing information or support, are highlighted.

In addition, the LhARA project includes researchers from across the UK. We will utilise their connections with schools/universities to advertise the diversity of careers available to young people, in particular those in under-represented groups, and the impact of physics. These efforts will highlight the local contribution to ion beam therapy in the different regions of the UK.

How many people do you expect to reach:

	In person	Online
Actively involved	50	0
Briefly actively engaged	200	>500
Passively engaged	0	>1500

What is your desired impact and how will you ensure this happens? Tell us what you are going to do, why you are doing it and how you will know it has worked. (Max 250 words) *

We propose to produce 4 podcasts focusing on different aspects of particle-based cancer treatment from radiation generation with particle accelerators to biophysics of cell damage. These podcasts will be released over several months together with more frequent posts on social media of short clips that will be used to grow the target audience. The podcasts will be produced with support from an experienced freelance team, and the IoP funds will be used to support these costs. The majority of the interviews will be conducted locally across the UK, supported by local members of the LhARA project.

A lot of young people are looking to make a difference in society and consider this when making important decisions about their futures. Many are not aware of the wide range of opportunities that are enabled by continued study of physics to GCSE, A-level and beyond. We aim to use the podcasts to highlight the diverse opportunities a training in

physics provides and will do this by including contributions from people at different stages of their careers who have followed different pathways (e.g. apprentices and technicians, physics graduate students and researchers, medical physicists and clinicians). In line with the “Limit Less Campaign” and “See it, Be it”, we will ensure our contributors include members of typically underrepresented groups. The content will also be made fully accessible.

Direct feedback through the cancer support networks and through social media will be used to demonstrate the effectiveness of the podcasts.

Tell us in bit more detail how you going to evaluate the impact of your project. E.g. What approaches, tools or methods are you going to use? (Max 250 words) *

The impact of the project will be measured by:

- 1) **Digital monitoring:** *Public interaction with the podcasts will be determined by monitoring the traffic to the podcast website and using analytics on social media. As well as measuring the number of listens and the number of people reached through social media we can monitor the points at which listeners ‘switch on/off’ and use this to gauge which topics the audience engage with. This will be used to shape the later podcasts.*
- 2) **Asynchronous feedback:** *A commenting function will be available so that the audience can leave feedback and questions. This will be monitored and questions addressed. Comments also provide the opportunity to engage asynchronously with the audience (e.g. using polls). Social media inherently provides mechanisms for measuring the reach of posts through the number of followers, comments and re-posts.*
- 3) **In person survey:** *Direct feedback from patient groups and lead nurses. We will conduct an initial anonymous survey to gauge existing knowledge of radiotherapy and the role of physics in medical technology with the patient support groups which will be used as a baseline. At regular intervals through the project (after each podcast release) we’ll reassess the groups to determine which aspects of the discussion were most effective at impacting both the audience’s understanding and confidence in medical technology but also their outlook on physics careers and their image of a physicist. Care will also be taken to include family members and centre staff as well as patients in the surveys.*

What will the legacy of this project be? We would be interested to know how you might share your learning and approaches, if you have plans to archive any of the materials, if you expect any of the partnerships to extend beyond the life of the project, or if any of the resources will be reused in the future.

(Max 250 words) *

The podcasts and videos will be hosted on the LhARA public website for at least the duration of the LhARA project (of the order of 10 years) and posts are expected to be available on social media for at least this period. If the impact assessments indicate that the public is engaging positively with the podcasts, we will apply for funds to expand the project to create additional podcasts chronicling the development of the LhARA project (novel particle acceleration, medical imaging, radiobiology ...), and construction of the UK-based ion beam research facility. Efforts will be made to ensure that the podcasts are maintained beyond the completion of the LhARA project so that they can be used by the cancer therapy community to provide continued insight for all.

What risks you are preparing and planning for? Do you have a plan in place to solve these potential problems? (please outline below. Max 250 words)

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The primary risk is lack of audience engagement.

Our close interaction with cancer support groups and LhARA provides us access to a large community from which we can find both active contributors and audience. Initial discussions have indicated interest and we will release snippets of the recordings through social media to maintain audience engagement.

We will run an initial survey to shape the content of the podcasts and determine parties interested in being actively involved in the podcast production. To facilitate volunteers, following NIHR guidelines, we will use a portion of the funding to offer financial compensation to the public for their involvement. The physicists interviewed will not be paid a fee but travel expenses will be compensated. The only exception will be for scientists from minority backgrounds who are often overburdened with science communication tasks for whom compensation will be made, in part from the engagement fund and in part from small funding sources at the local institute hosting the podcast episode.

Each podcast will be storyboarded and reviewed by representatives from the physics research, patient groups and science communicators. This will ensure that the podcasts are appropriately pitched and engaging as well as that content is prepared in an

accessible manner (e.g. all websites/social media posts are screen readable with alt-text for images).

To ensure the recordings are of high quality, we will use a production team who will provide equipment and editing services.

For reference here are the guidelines (will not be uploaded in submission):

<https://www.nihr.ac.uk/documents/payment-guidance-for-members-of-the-public-considering-involvement-in-research/27372>

How will you manage practical considerations such as GDPR, health and safety, safeguarding, insurance, intellectual property and copyright? (Max 250 words) *

All contributors to the podcasts will be acknowledged and will have provided written consent to participate in the proposal. No children younger than 13 years old will be invited to participate in the project and any interviews with younger contributors will be conducted in the presence of a guardian and in 1-2 sessions which does not require formal police checks.

Any necessary personal information used for the production of the podcast (emails/phone numbers) will be maintained on secure systems and encrypted in line with GDPR. At the end of the project, this information will be deleted.

The videos and podcasts will be released under a creative commons license allowing reuse for non-commercial purposes.

Timescale

Total : 12 months

Month 1 - 3 :

- *Survey topics of interest and audience perspectives on physics.*
- *Build contributors list*
- *Source production team*
- *Initial storyboarding of podcasts 1& 2*
- **Deliverables:** *initial survey and contributor list, production team agreement.*

Month 3 - 5:

- *Finalise storyboard and record interviews.*
- *Edit and release at end of month 5.*
- **Deliverable:** *2 podcasts*

Month 5 - 7:

- *Survey response to podcasts 1 and 2*
- *Storyboard for podcast 3*
- *Recording of interviews*
- *Release of podcast at end of month 7.*
- **Deliverables:** *Survey 2 and podcast 3*

Month 7 - 11:

- *Survey response to podcasts 1 and 2*
- *Storyboard for podcast 3*
- *Recording of interviews*
- *Release of podcast at end of month 7.*
- **Deliverables:** *Survey 2 and podcast 3*

Month 11 - 12:

- *Closing survey and assessment of impact.*
- **Deliverables:** *Survey 2 and podcast 3*

Evaluation report delivered at 12 months following start of project

Budget:

Total project costs: £3750

Total from engagement fund: £3000

Total cost breakdown:

<i>Description</i>	<i>Engagement fund</i>	<i>External funds</i>
<i>Production team (£500/podcast)</i>	<i>£2000</i>	<i>Potential £1000</i>
<i>Volunteer payments</i>	<i>£500</i>	
<i>Travel costs for public and researchers</i>	<i>£500</i>	<i>£500</i>
<i>Web design and hosting</i>	<i>£0</i>	<i>£250</i>

Additional funding sources:

Through association with LhARA, we will be able to access £500 towards travel expenses for researchers involved with the LhARA project to participate in interviews.

We are also seeing support from Imperial College London's public-patient partnership seed funds which may provide up to £1000 and enable us to expand the total number of podcasts from 4 to 6. This would lead to the release of pairs of podcasts at 5, 7 and 11 months as outlined.