

THE UNIVERSITY OF MANCHESTER
PARTICULARS OF APPOINTMENT
FACULTY OF BIOLOGY, MEDICINE AND HEALTH
SCHOOL OF MEDICAL SCIENCES
DIVISION OF CANCER SCIENCES
RESEARCH ASSOCIATE IN PROTON THERAPY DETECTOR DEVELOPMENT
VACANCY REF: BMH-032638

Salary:	£38,448 per annum (Grade 6.1)
Reporting to:	Dr Michael Taylor, Senior Lecturer in Proton Therapy Physics
Tenure of post:	Fixed-term contract from 13/12/2026 to 31/03/2027 (with the possibility of starting earlier)
Hours per week:	35 hours per week (1 FTE)
Location:	Proton Therapy Building, The Christie NHS Foundation Trust

Enquiries about the vacancy, shortlisting and interviews:

Dr Michael Taylor,
Senior Lecturer in Proton Therapy Physics
Email: m.j.taylor@manchester.ac.uk

The University of Manchester

The University of Manchester is the largest single-site university in the UK with around 38,000 students and more than 11,000 staff. We are committed to delivering (a) an outstanding teaching and learning experience; (b) contribute to the social and economic success of local, national and international communities; (c) producing the highest calibre graduates; (d) developing our staff to be amongst the very best of their peers. Our trajectory is excellent, evidenced by recently being named as the world number one university in the THE Impact rankings.

We are unique in the UK higher education sector in having Social Responsibility as one of our three core strategic goals, sitting equally alongside our commitments to research and teaching. To achieve our ambitious goals, we aim to attract and retain the very best people to work across a range of academic disciplines and support functions.

The University of Manchester strives to make our community a welcoming, caring and enthusiastic one, fuelling ambition, combined with opportunities and support to help us all achieve our personal and professional goals. Our diverse job opportunities include an attractive benefits package with family-friendly policies that provide for flexible working. We care deeply about career and personal development, offering a structured induction programme for new staff, an annual performance and development review, staff training for all career stages and mentoring opportunities to support your career development. We have a genuine commitment to equality of opportunity for our staff and students, and our ambition is to employ a workforce that reflects the diverse community we serve.

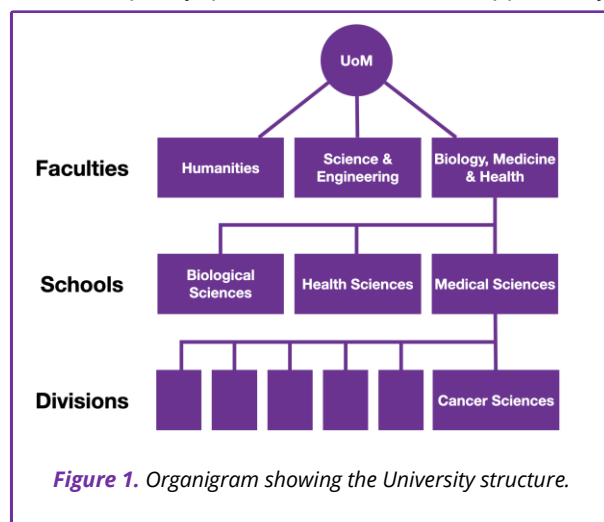
As a global institution, situated at the heart of a lively, culturally diverse city, we welcome applicants of all nationalities.

Faculty of Biology, Medicine and Health (FBMH)

The Faculty of Biology, Medicine and Health (Figure 1) has an integrated structure to deliver a truly translational approach to the life sciences, ensuring smooth research pathways - from pure discovery science through to clinical application and patient care. With a total annual income of over £300 million, and over 3,000 members of staff, the Faculty is comparable in size to a medium-sized UK university. Thirty undergraduate and 90 postgraduate programmes offer our 11,000 students opportunities to develop the skills and knowledge they need for a successful career. The integration of discovery biology, clinical application and patient care within a single Faculty, particularly in a region with notable health inequality, provides us with a real opportunity to have a very significant and positive impact on people's lives.

The School of Medical Sciences (SMS)

The School of Medical Sciences is one of three Schools which form the Faculty of Biology, Medicine and Health. Led by Professor Tony Heagerty, the School contains the Divisions of Cardiovascular Sciences; Cancer Sciences; Dentistry; Developmental Biology and Medicine; Diabetes, Endocrinology and Gastroenterology; and Medical Education. In addition to a strong and diverse research base, SMS has a major teaching portfolio, being responsible for the MB ChB and BDS programmes plus a large suite of Masters courses.



Staff Learning and Development

The Staff Learning and Development (L&D) team supports the personal and professional development of all staff in the University.

They work closely with learning experts around the University including those based in local HR teams and those supporting academic staff and early career researchers (ECR).

L&D offers everything from off-the-shelf, face-to-face training, to bespoke one-to-one development support. By planning activity both in response to the strategic goals of the University and the learning needs of individuals, we aim to become a truly leading learning organisation.

Centre for Academic and Researcher Development

Based within the Faculty of Biology, Medicine and Health, the Centre for Academic and Researcher Development delivers a number of face-to-face training programmes providing a variety of development opportunities for postgraduate students, research staff and academic staff.

Their goal is to create an environment that supports you through every stage of your career, allowing you to excel and reach your full potential.

Development opportunities include:

- Faculty-specific 'New Academic and Fellows Programme'
- Academic Staff Development Programme – supporting you through the different stages of your academic career
- Pedagogic and Staff Development Programme
- Mentoring
- Leaders in Teaching Programme
- Promotion workshops and access to 'Promotion Champions'

Division of Cancer Sciences (DCS)

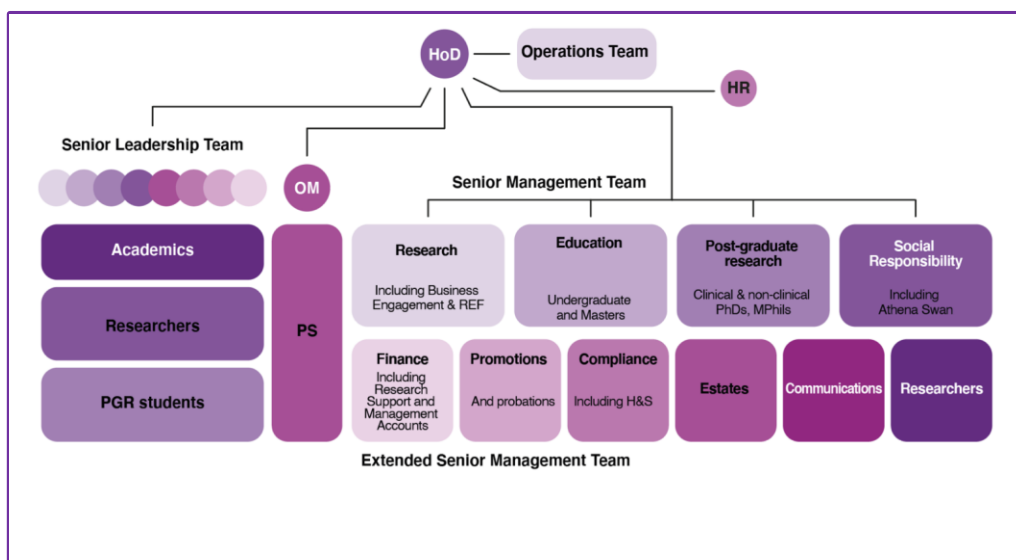
The Division of Cancer Sciences (DCS), which is effectively a large university department, was created in August 2016 with Prof. Stephen Taylor appointed as Head of Division in February 2019. It is a major contributor to the University's Cancer beacon and the wider Manchester cancer ecosystem, with research interests spanning discovery science, translational research and clinical studies.

The Division currently comprises approx. 300 staff including 66 academics, 66 researchers, 131 trainees and 28 admin staff. 168 honorary staff are associated with the Division; while not employees of the University they make invaluable contributions to a wide range of our activities, adding breadth and depth to our research, business engagement, teaching, social responsibility and internationalisation.

The Division of Cancer Sciences is very research active; with associated awards in 2016-2020 totaling over £450M. DCS has a strong portfolio of income from industry, working with a number of companies including Novartis, AstraZeneca, Merck, GlaxoSmithKline and Varian. The Division has a healthy pipeline of industrial collaborations, and we wish to build on these successful partnerships. Supporting a strong research profile, DCS generates a large number of high-quality publications, and we envisage a strong REF return at the next national audit. A large proportion of publications are in clinical oncology journals (e.g., *Lancet Oncology*, *J Clin Oncol*) consistent with the Division's strength in clinical research, but DCS staff also publish in high impact discovery journals (e.g., *Nature*, *Cancer Cell*).

Division staff contribute to a wide variety of teaching activities, including at undergraduate level within SMS (e.g., lectures, PBLs, PEPS and APEPs on the pre-clinical MB ChB program) and SBS (e.g., lectures, tutorials, practicals and projects on various life sciences units). The Division contributes to units in other Faculties, (e.g., medical physics in FSE). The Division also runs a number of Masters programs in the oncology space (e.g. Experimental Cancer Medicine, Oncology, Medical Physics in Cancer Radiation Therapy). In 2019, the Division

made its first teaching-focused appointment with the primary objective of establishing a novel blended online Transformative Oncology Masters program. To manage the Division, we have established a comprehensive sub-structure comprised of an Operations Team, a Senior Leadership Team, a Senior Management Team and committees (Figure 2). The Operations



Team meets weekly to update, discuss and action a variety of operational matters. The Senior Leadership Team consists of senior academics whose role is to assist the Head of Division with line management and annual P&DRs of the academic staff, and to provide guidance and advice to the Head of Division. In Spring 2020, we established a comprehensive set of sub-committees covering key areas of activity. The key leads form the Senior Management Team (SMT), who meet frequently to develop and deliver the Division's strategy. This new structure provides a functional framework for the Division and is allowing researchers and junior academics to help shape the Division into a vibrant academic environment. For example, the Researcher Committee has established an internal seminar series, while in parallel, four junior academics have established a 'Next generation' external seminar program which showcases external cancer-related research from investigators at the early stages of their independent careers. The Division now has an active Twitter feed to showcase our activities, and a popular use of this platform has been the *day in the life series*, where an individual takes over the account for a day to provide insight into the daily activities of our cancer researchers.

Our strategic partnerships

The Division of Cancer Sciences has a number of key strategic partnerships that underpin its ambitions to develop next generation teaching and research.

The Manchester Cancer Research Centre. Led by Professor Rob Bristow, the MCRC is a world-leading research partnership founded by The University of Manchester, Cancer Research UK and The Christie Hospital NHS Foundation Trust and is responsible for driving a consistent and integrated strategy for cancer research and innovation in Manchester. The MCRC's vision is that by uniting science and driving clinical excellence we will create a future free from the burden of cancer. In order to achieve this vision, the MCRC is leading in the development of prevention and early detection and precision medicine strategies that enable cancer to be identified earlier and curative treatments to be delivered to everyone. As a hub for cancer research in the University structure, the Division of Cancer Science is a key component of the MCRC with many of our academic cohort working closely with the MCRC to drive a *one-Manchester* cancer vision to achieve *Precision Medicine for All*.

The Cancer Research Manchester Institute. Led by Professor Samra Turajlić, the CRUK MI is a leading cancer research institute within The University of Manchester, spanning the whole spectrum of cancer research, from investigating the molecular and cellular basis of cancer, to translational research and the development of therapeutics. The Institute supports a number of investigative programmes, spanning both basic and translational cancer research. It has excellent laboratory facilities and outstanding core services, including genomic sequencing, confocal microscopy, bioinformatics, histology, and access to mass-spectrometry based proteomics. Staff within the Division of Cancer Sciences work very closely with CRUK MI staff at both the research and operational level, sharing both lab and dry space across the cancer campus, and together with the MCRC we aim to create a truly fantastic working environment that will allow all three partners to deliver their strategic goals.

The Christie Hospital NHS Foundation Trust. The Christie Hospital is the largest single site cancer centre in Europe, treating more than 60,000 patients a year. Based in Withington, it serves a population of 3.2 million people across Greater Manchester and Cheshire while more than a quarter of our patients are referred to us from across the UK. The Christie is ranked as the most technologically advanced cancer centre in the world outside North America and has been named by the National Institute for Health Research as one of the best hospitals providing opportunities for patients to take part in clinical research studies. The Christie's clinical services include radiotherapy, where it is home to one of the world's largest radiotherapy departments and is now also the first NHS organisation in the UK to deliver high energy proton beam therapy; chemotherapy where it is one of the UK's largest chemotherapy units, highly specialist surgery for complex and rare cancers as well as a wide range of support and diagnostic services.

In addition to the Christie NHS Foundation Trust, the Faculty works alongside five additional local NHS Trusts as a key member of the Manchester Academic Health Science Centre (MAHSC) - a federation of equal partners that unites leading healthcare providers with world-class academics and researchers. It aims to be a global centre for the delivery of applied health research and education and provide leadership for our local and regional health systems.

The Faculty also plays a leading role in Health Innovation Manchester (HInM), which was launched in September 2015, as part of the UK Government's decision to devolve health and social care responsibilities to Greater Manchester. HInM offers a unique opportunity to bring together health and social care, academic and life science related business resources across the region to deliver an innovative health ecosystem that can help accelerate innovation into our local health and social care systems, enhance our global scientific standing and act as a magnet for inward investment.

About the Team

The post-holder will join the PRECISE Proton Therapy Research Group within the Division of Cancer Sciences at the University of Manchester and will work in close collaboration with colleagues at The Christie Hospital NHS Foundation Trust. The role sits within a multidisciplinary academic and clinical environment focused on translational proton therapy research.

The successful candidate will be line managed by Dr Michael Taylor and will contribute to a project that uses specialist proton therapy research infrastructure to support detector development, experimental validation and clinical translation.

Overall Purpose of the Job

The post-holder will contribute to the delivery of a short-term translational pilot project focused on developing and evaluating a novel time-of-flight (TOF) detector system for in-vivo range verification in proton beam therapy. The role will involve prototype development, experimental validation and data analysis in research and clinical settings, supporting translation of the technology towards clinical application.

The position offers an opportunity to work at the interface of physics, engineering and clinical radiotherapy within a multidisciplinary academic and clinical environment spanning the University of Manchester and The Christie Hospital NHS Foundation Trust.

Key Responsibilities, Accountabilities or Duties

The range of duties will include:

- Design, construct and optimise a prototype time-of-flight based range probe integrating ultra-fast silicon detectors and timing electronics.
- Plan and undertake experimental measurements in the proton therapy research facility to characterise detector performance, timing resolution and calibration against proton range.
- Carry out validation studies using appropriate phantom models and compare findings with established clinical systems and detectors.
- Analyse and interpret experimental data to assess system precision, uncertainty and performance against project objectives.
- Support the evaluation and testing of the system in research and clinical settings, including consideration of feasibility, safety and dose implications for in-vivo use.
- Work collaboratively with academic, clinical and technical colleagues across the University of Manchester and The Christie NHS Foundation Trust to support delivery of the project.
- Contribute to project reporting, milestone tracking and the planning of experimental work within clinical and operational constraints.
- Contribute to the dissemination of research findings through presentations, publications and project outputs arising from the pilot study.
- Maintain accurate records of experimental work and data and ensure compliance with relevant health and safety requirements, particularly in radiation environments.
- Undertake any other duties commensurate with the grade as reasonably required by the project.

Person Specification

Knowledge

Essential

- PhD (or near completion) in physics, medical physics, engineering or a closely related discipline.
- Knowledge of detector systems, instrumentation or radiation physics.
- Understanding of scientific programming and data analysis methods.
- Understanding of experimental methods relevant to translational radiotherapy research.
- Knowledge of the principles underpinning proton therapy, radiotherapy physics or related particle detection approaches.
- Knowledge of clinical or healthcare research environments.

Desirable

- Awareness of current approaches to in-vivo range verification or related detector technologies.
- Knowledge of time-of-flight measurement techniques, fast timing electronics or Monte-Carlo methods.
- Awareness of the translation of detector technologies into clinical radiotherapy settings.

Experience

Essential

- Experience in experimental research involving detectors, instrumentation or radiation physics.
- Experience of designing and conducting experiments independently.
- Experience of analysing complex data sets and interpreting results.
- Experience of working effectively within a multidisciplinary research team.
- Experience of preparing research outputs such as publications, presentations or reports.

- Experience relevant to proton therapy, radiotherapy physics, particle detection or a closely related experimental field.

Desirable

- Experience of working with time-of-flight measurement techniques or fast timing electronics.
- Experience of working with Monte-Carlo simulation tools.
- Experience of working in clinical or healthcare research environments.
- Experience of in-vivo range verification research or related translational detector development.

Skills/Attributes

Essential

- Strong analytical, organisational and problem-solving skills.
- Excellent written and verbal communication skills.
- Ability to plan and prioritise work to meet project milestones.
- Ability to work independently and collaboratively across disciplines.
- Attention to detail and commitment to accurate record-keeping.
- Commitment to safe working practices, particularly in radiation environments.

The above particulars are intended as a general guide to the duties of the post and the conditions of service. They do not constitute a contract of employment between the University and the person appointed. The successful applicant will, however, receive a full set of conditions of service on appointment.
