

Department of Physics: Ambitions, strengths, challenges and performance

The Department aims to contribute strongly to the delivery of the University and Faculty KPIs and objectives, and to realisation of the 'Strathclyde 2025' vision, whilst actively promoting the University's values.

Our short and medium term ambitions:

- Maintain and strategically shape a well-functioning team of internationally leading researchers. We have a track record of attracting outstanding new staff from Chancellor's Fellows to Professors. To maintain the recent growth in research (KPI6) and KE activity (KPI10) and support our research strategy, including a growing PGR population (KPI8), a key objective is to identify additional candidates in areas that bridge gaps in our portfolio.
- Our ambitions for workforce growth require growth in our income. We aim to achieve sustainable long-term growth of existing strong grant income from UKRI and other sources (KPI6), exploit University strategic partnerships (e.g. NPL), extend international collaborations with key partners and expand industrial engagement from PGR support (KPI8) through research and innovation projects to KTP (KPI10).
- Maintain a high-level REF performance, i.e. top quartile. This is a realistic ambition for a Department of our size without a "Big Science" or Astronomy section. Our short term ambitions are to continue to grow our high proportion of 3*/4* research outputs (KPI7) and impacts, and reduce the number of staff without 3*/4* outputs. A medium term ambition is to make sure there is a healthy impact pipeline for REF 2027(?).
- We aspire to grow our Knowledge Exchange portfolio, including KTPs, licence deals and spin-outs in the longer term (KPI9). Our first KTP was secured in summer 2018 (KPI10). Our ambition is to have 2-3 KTPs as a sustainable portfolio that resources our KE Associate, who is in turn helping to facilitate our industry-linked strategy.
- We aspire to increase 'non-Home' student numbers at UG and PG levels, including RUK and international (KPI12), through expansion of international partnerships (KPI11) and development of part time, flexible learning versions of PGT programmes (KPI5). In the short-to-medium term, specific opportunities are being pursued with the aim to bring in Chinese students under IJEP.
- Attainment of the SIMD0-40 intake target (KPI1), supported by participation in school outreach activities.
- Enhancement of our student experience, via improvements in our UG curriculum (e.g. alignment of the maths and physics content); maintain our overall strong performance in the NSS (KPI3).
- Increase the diversity of our workforce. Our short term ambition is to renew our Athena SWAN Bronze award and we will work towards an application for Silver in the medium-long term.

Our key strengths:

- Our research quality in terms of outputs and impact (REF 2014). This is particularly true of Impact, which is an important factor in REF 2021.
- International research leaders across our four divisions and a strong international profile (via connections to the International Max Planck Partnership, Fraunhofer and strategic international partnerships).
- A consistently high grant income for the physics discipline (EPSRC's top ten for physics departments).
- State-of-the-art research facilities (e.g. SCAPA, atom trapping, microscopes, microfabrication,...).
- Playing an active role in TIC2, leading the industrial and strategic partner engagement in quantum technology.
- Consistently performing strongly in the NSS (albeit with a small decrease in three categories this year).

Key challenges and how these can be overcome:

- Student Experience / Internationalisation: Our targets for overseas student numbers, and in particular PGT, are high. We are working to make our courses more attractive to overseas students, but there is a limited market available and our fees are high. The University ranking in some league tables is also a factor.
- Student Experience / Finance: Relative to other departments in the Faculty, our student-to-staff ratio is low for UG and PGT, with a corresponding low contribution to total tuition fee income. Our efforts to improve this have produced a year-on-year increase (e.g. from £29k/FTE in 2014 to £34k/FTE in 2016).
- Student Experience: Increasing the number of UG entrants from SIMD0-40 areas. We note that for 2018, 20% of those school pupils who take Higher Physics come from the SIM0-40 grouping (Data from Scottish Government August 2018). We are working in close partnership with the Widening Access team.
- Research: Our PGR intake has flat-lined, against a target for growth. A student intake of around 30 represents an annual commitment to PGR students in excess of £2M, which is challenging to grow. We are exploiting every opportunity to overcome this, including leadership of a CDT bid and involvement in several others.
- Operational Excellence / Staffing: The gender imbalance in the Departmental profile is a concern (female percentage: Academic = 11%; Research = 8%; PGR = 23%). Whilst this is similar to other Physics departments, we are taking action to address this, e.g. through development and implementation of our Athena SWAN action plan and the implementation of the W@SPs (Women@Strathclyde in Physics) initiative.
- Operational Excellence / Infrastructure: Whilst recognising that the University has made significant investments in the refurbishment of the John Anderson Building, we continue to face a number of ongoing issues with our

accommodation, including leaking windows, water ingress, issues with service provision to research labs and constant problems with our main lift (Richmond St. entrance). Additional investment is needed to address these.

How we are enhancing performance:

Outstanding Student Experience

- We are continually assessing the viability of existing courses and opportunities for introducing new ones. This has resulted in revision of our UG curriculum to improve alignment of the maths and physics content (we are actively rolling this out). New opportunities for quantum courses for PGR students will benefit PGT students as well.
- We are continuously reviewing and adapting our action plan to maintain a strong performance in the NSS. Additional measures this year include individual interviews of final year students and group feedback sessions.
- We are seeking to increase our overseas and RUK UG and PGT student intake through recruitment drives emphasising our strong research position, and are developing collaborative education arrangements, especially in China and the Middle East. We are investigating ways to internationalise our curricula (e.g. via online learning).

Internationally-leading Research

- We are working to maintain, and where possible increase, our research grant income through active encouragement and support mechanisms. These include encouraging staff to participate in the Grant Writing Challenge and holding meetings between staff needing extra support and the HoD and Director of Research. We are also providing additional support (e.g. mentoring) to our Chancellors Fellows.
- We are intensifying our research through further investment in star appointments (GTAP and CF). In preparation for REF, we are communicating performance expectations via multiple channels, including Departmental Committee meetings and focused meetings with staff who do not have at least one output that is definitely at least at the 3* level (per academic). We are making those in this category aware of what needs to be done to address this in the remaining time to submission. We are monitoring our output on an on-going basis to inform this process, whilst also working up compelling Impact case studies.
- We are introducing workshops to engage early with researchers to help them shape fellowship applications for competitions in 2019/20 and to promote a pipeline of fellowship applications.
- We are working together to create as many opportunities as possible to increase our PGR numbers and recruit the best possible students. This includes through further engagement with external partners e.g. non-RCUK funding bodies, industrial collaborators and NPL, and through leadership and contribution to CDT bids. We have also minimised the time between application and offer to enhance conversion rates.

World-leading Innovation and Impact

- We appointed a KE Associate, who has secured our first KTP, awarded in summer 2018 (KPI10). We have targeted this funding mechanism and are at an advanced stage in our next KTP application, while reviewing further opportunities. We hold 5 Innovate UK awards, with one pending application currently under review.
- We continue to work on growing our spin-out portfolio in the longer term (KPI9). We have a strong track record on this front, with the mLED spin out being the biggest of its kind for the University and other substantial successes including Horiba-IBH, Cascade and MicroLase (led to M-Squared and Coherent Scotland). Several pieces of IP have been identified as potential spin-out opportunities and these are being explored on a case-by-case basis.
- We had appointed a Commercial Business Development Manager, who moved on in April 2018. We are looking to re-appoint to this position in order to fully capitalise upon emerging opportunities and to support the growth of licence deals. Four new patents have been filed this year and efforts are focused on commercialising this IP. Two recent Innovation/Enterprise fellowship awards in the IOP are expected to expedite efforts to identify commercial partners. There is also a healthy pipeline of an additional 12 invention disclosures at various stages of translation.
- Key areas are emerging as industrially relevant research themes - these include Quantum Technologies, Manufacturing and Space. These research areas are underpinned through substantial EPSRC funding that has an innovation component (Quantum Tech Hubs and Manufacturing Programme Grants). The aim is to further develop these themes with a view towards leveraging funds from the Industrial Challenge Strategy Fund.

Financial sustainability:

We are working towards improving our financial sustainability through a combination of increasing income from research grants, teaching and KE activities, and reducing our core salaries expenditure. This includes efforts to:

- Increase the number of staff holding significant research grants (almost all of our staff now hold grants as PI).
- Increase our recovery rate (which has been going up, resulting in a total recovery of >£2M per annum).

Our share of the Faculty's savings target for 2018/19 is being addressed through:

- Salary savings. A member of the Professoriate retired and an academic staff member has moved on.
- Identifying unrealised income from SCAPA access fees. Part of these fees contribute to salary expenditure (the SCAPA Manager and laser scientists/technicians).