

EPSRC Quantum Technologies Training and Skills Workshop

22nd & 23rd April 2021, Online



**Engineering and
Physical Sciences
Research Council**



EPSRC Quantum Technologies Training and Skills Workshop

Overview

This is a report on a workshop held on the 22nd and 23rd April 2021. The aim of the workshop was to inform delegates about fellowships and how they can benefit their career and to gather information about attendees career ambitions and perceived barriers. This information will feed into the development of a targeted Quantum Technologies career development fellowship to be launched Summer 2021.

Key messages

There was general agreement that the UK was a great place to be working in Quantum Technologies (QT) and the majority of the attendees were keen to stay in academia within the UK. Discussion largely focused on how a fellowship could support career development;

- allowing dedicated time to develop skills and training, especially softer skills such as networking, business engagement and project management;
- developing a route to research independence in a structured manner, especially for experimentalists beholden to large pieces of experimental equipment;
- providing job stability, a particular concern of many present.

A fellowship could also provide a structured way for recipients to balance teaching commitments with the pursuit of their own research.

Mentorship from senior leaders, both within academia and industry, was a subject many had strong opinions on, believing it to be crucial to their career development. In tandem with this, delegates were keen to get recognition for and experience of supervising doctoral students; work they often do on behalf of more senior supervisors. Recognition for the time they spend on knowledge transfer work – especially important for a technology focused sector – was also considered important.

Delegates were keen to hear more on the subject of career development and the different career pathways the QT sector offered. They were also strongly supportive of a cohort approach to support networking and generally more engagement with colleagues across the national programme. Essentially delegates wanted to hear more about the National Quantum Technologies Programme as a whole, the work of EPSRC and what opportunities there were for them to be involved and access funding.

In summary a fellowship between 3 and 5 years in length that could accommodate skills and training for post-doctoral career development, offered opportunities to be both mentor and mentee, allowed for industry collaboration in varying degrees and provided flexibility in terms of time commitments and changes to personal circumstance was desirable.

Contents

Overview	2
Key messages	2
1 Motivation	4
2 Objectives	5
3 Background	5
4 Selection of participants.....	5
5 Agenda	5
Day 1 April 22 nd 13:00-16:00	6
Day 2 April 23 rd 9:30-12:30	6
6 Outputs	7
6.1 Outputs from first day	7
6.2 Outputs from second day	7
7 Summary	8
8 Next steps.....	10
9 More information.....	10
Appendix	11
First Q&A session with Sir Peter Knight and Dr Katharine Dunn.....	11
First mentimeter session	11
Second Q&A session with UKRI and EPSRC fellows	12
Second Mentimeter session.....	12
6.2 Outputs from second day	14
Breakout 1 – career ambitions and barriers.....	14
Breakout session 1, group 1.....	14
Breakout session 1, group 2.....	15
Breakout session 1, group 3.....	16
Breakout 1, group 4	17
Breakout 2 – Ideal Career Development Package	18
Breakout 2, group 1	18
Breakout 2, Group 2.....	19
Breakout 2, group 3	19
Breakout 2, group 4	20

1 Motivation

Quantum Technologies are set to transform the global society and economy with significant efforts being put into developing quantum technologies around the world. The National Quantum Technologies Programme (NQTP) was established in 2014 to make the UK a global leader in the development and commercialisation of these technologies. This focus has set the UK apart from the international competition but the UK needs to continue moving forward as technological developments gather pace.

The NQTP [Strategic Intent](#) sets out the programme's ambitions for the next 10 years and aims to make the UK:

- A global centre of excellence in quantum science and technology development
- The go-to place for quantum companies or global companies to locate their quantum activities and;
- A preferred location for investors and global talent

None of this can be achieved without a “quantum ready” workforce and the NQTP Strategic Intent makes a commitment to “attract, grow and retain talent” within the UK. The transition of quantum technologies into commercial products requires a new generation of quantum physicists, engineers and mathematicians who are fluent in multi-disciplinary and systems base approaches, possess the right entrepreneurial and business skills and can adapt to new roles in industry. People and know-how are the most important elements of the emerging quantum technologies ecosystem.

During the first phase of the National Quantum Technologies Programme (2014 – 2019), EPSRC funded a national network of Quantum Technology Hubs through a £120 million investment in four hubs over five years. These were to harness the UK's strengths in quantum science by turning this into strength in quantum technologies. As part of their investments in the second phase of the National Programme, EPSRC has refreshed the Quantum Technology Hubs with a £94 million investment in four hubs over five years, to maintain the technological research leadership that the UK has established in quantum technologies through the UK National Quantum Technologies Programme. EPSRC have also supported skills and training through the creation of [Centres for Doctoral Training](#) and Training and Skills hubs.

During the first phase of the NQTP, the first round of Quantum Technologies Fellowships aimed to support both the individuals and their teams to help realise some of the country's potential. The Fellowships were aimed at Early and Established career stage academics whose research focused on the direct exploitation of quantum phenomena, such as superposition or entanglement, to address the challenges of translation of quantum science through technology to eventual application. The aim of the fellowships was to develop potentially transformative research in areas that contribute to the development of novel quantum technologies. These have now, or will shortly, come to an end and it is timely to revisit the need for fellowships in the QT field.

Through the Quantum Technology Hubs and other quantum technology projects the Engineering and Physical Sciences Research Council (EPSRC) are a key partner within the NQTP and share the ambition to maintain the UK's reputation as an excellent place to do research. As an NQTP partner, EPSRC are committed to growing, retaining and supporting talented people to lead within the Quantum Technology (QT) arena. Excellent research leaders will form the backbone of the UK's quantum enabled economy and this workshop is one aspect of a broader strategy to ensure that the UK has the future scientific leaders it needs.

2 Objectives

The objectives of the online workshop sessions were two fold:

- **Inform** the audience about the NQTP and fellowships
- **Discover** attendees career ambitions and perceived barriers to those ambitions

The workshop was designed to gather information that will be used to design a bespoke Quantum Technologies fellowship with the aim of retaining early career research staff working in a Quantum Technology discipline within the UK.

3 Background

Across all academic subjects the biggest loss of trained talent happens between PhD and first permanent academic career post ([Higher Education Policy Institute, July 2020](#)). 70% of all PhD students would like to stay within academia but ultimately, on average, only 30% find academic roles in their subject of choice. Post-Doctoral Research Assistants (PDRAs) are particularly vulnerable to leaving academia as they are generally not able to obtain permanent contracts and may have to move some considerable way to get a suitable post. Work was done by the EPSRC QT team to identify gaps in current EPSRC provision and this, combined with data from a number of sources i.e. EPSRC data on the destination of PDRAs associated with the EPSRC QT Hubs; a skills survey by BEIS (Department for Business, Energy & Industrial Strategy), it was decided that the EPSRC NQTP training and skills strategy should initially focus on retention of PDRAs within QT, within the UK.

The EPSRC supports career development and, along with our parent body, UKRI, run a number of Fellowship schemes aimed at supporting researchers at a number of stages throughout their career. Fellowships aim to provide the best academic minds with the means to gain research independence, extensive career development and generally give the means for talent to flourish. A thriving research eco-system requires talented PDRAs to develop skills to respond to the new challenges thrown up by the fast pace of change. With that in mind EPSRC wish to design a QT fellowship that supports the needs of current PDRA's working in the QT arena. This new fellowship will not replicate currently available fellowships, such as EPSRC Open Fellowship or the Future Leaders Fellowship, but will specially target gaps identified in the workshop.

4 Selection of participants

Given the short timescale and the connected nature of the Quantum Technologies community within the UK it was decided to ask each of the EPSRC QT Hubs to nominate 6-8 potential invitees that would reflect a breadth of research interests and institutions who would benefit from attending. Each presenter was also asked to nominate a candidate they would like to invite. The workshop was by invite only.

5 Agenda

The workshop was divided into two parts, on two consecutive days. The agenda was designed to minimise zoom fatigue offering a mixture of talks, Q&A sessions and interactive audience participation sessions. The first part was designed to inform the audience about fellowships and the NQTP's role in developing QT skills and talent across the UK and to get participants thinking about their own career aspirations and needs.

This section comprised presentations on EPSRC, NQTP and from a number of active QT fellows. [Mentimeter](#) was used as an interactive information gathering tool; polling the audience on various subjects.

The second part was designed as an information gathering exercise to enable EPSRC to collect information about career aspiration and potential barriers and issues around pursuing a QT career in the UK from a PDRA point of view. Participants were then asked to “design your own career package” by choosing various elements of a fellowship that they felt would help them most in developing their QT career. [Miro](#) was used as an interactive whiteboard tool during the workshop sessions.

Day 1 April 22nd 13:00-16:00

13:00-13:05	Welcome – Sarah Stacey, EPSRC QT Theme
13:05-13:15	Introduction to the EPSRC QT Team priorities and skills and training opportunities. Presenter: Katharine Dunn (Joint Head of Quantum Technology, EPSRC, UKRI)
13:15-13:35	The UK National Quantum Technology Programme and UK skills in QT. Presenter: Professor Sir Peter Knight, Chair of the NQTP Strategic Advisory Board.
1:35-13:50	Question and Answer session
13:50-14:05	Getting to know each other: Mentimeter session Presenter: Sarah Stacey
14:05-14:20	Comfort Break
14:20-14:35	What is a fellowship? Presenter: Sarah Stacey
14:35-15:15	Me and my fellowship. 4 presentations by UKRI and EPSRC fellowship holders Anthony Laing, Elham Kashefi, Chris Ballance, Jonathan Pritchard
15:15-15:40	Fellowship Q & A session – A chance to ask career development questions to the fellows. Presenter: Katharine Dunn Panel: Anthony Laing; Elham Kashefi, Chris Ballance, Jonathan Pritchard
15:40-16:00	What are your career aspirations? Mentimeter session. Presenter: Cameron Ross
16:00	End of first Day

Day 2 April 23rd 9:30-12:30

09:30-09:40	Introduction and plan for the day Using Miro
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09:40-10:20	Breakout session 1: QT Career development in the UK
10:20-10:50	Feedback from the breakout session groups
10:50-11:05	Comfort Break
11:05-11:50	Breakout session 2: What career package would retain QT expertise in the UK?
11:50-12:20	Feedback from the breakout session groups
12:20-12:30	Next steps and workshop close

6 Outputs

6.1 Outputs from first day

The first section of the programme was an introduction to EPSRC and the NQTP with opportunities to ask questions of Sir Peter Knight (NQTP Strategic Advisory Board Chair) and Dr Katharine Dunn (EPSRC). There then followed an interactive “getting to know you” session using Mentimeter. This session was intended to gain a sense of who was in the room and the range of experience within the audience. This proved to be a wide range; from those who had recently finished their doctoral studentships to highly experienced PDRAs; from a variety of backgrounds and levels of involvement in the NQTP.

The second half of the programme was focused on “What is a fellowship?” with presentations on UKRI and EPSRC fellowships and talks from 4 holders of UKRI and EPSRC fellowships in Quantum Technologies. This was followed by a panel session where the audience asked fellowship holders about their career journeys. The day rounded off with a second Mentimeter session designed to gather information about the general career aspirations of those attending which would contribute to breakout session discussions the following day.

6.2 Outputs from second day

The second half-day was broken into two sections with breakout sessions. The first session followed on from the previous day and asked participants to discuss, within groups, their career aspirations and identify any potential issues. There were 4 groups with attendees allocated so there were a mix of expertise and universities in each group.

In the first session the attendees were asked about their career development ambitions. These are some of the sample questions given. Not all groups considered all questions

- What attracted you to your current role?
- What do you see as the next stage in your career?
- What opportunities are available for you to develop your career in the UK?
- Are there any issues that you currently anticipate that would prevent you in pursuing a QT career in the UK?
- What support would help you develop your QT career? What support do you currently receive?
- What skills or experiences are important to your career development?
- Is staying in the UK attractive to you?

After the breakout session each group were asked to report back on their discussion to the main room and a wider conversation on the subjects raised was had.

In the second session attendees were asked to consider their ideal fellowship package. They were given a list of potential ideas but were encouraged to add their own thoughts.

- Length
- % of time spent on the fellowship (teaching/research/industry placement)
- International collaborations
- Industrial partnerships or secondments
- Community engagement
- Portability of award
- Path to research independence
- Support for changes to personal circumstances
- Level of experience to qualify
- Support for non-traditional career pathways
- Support for personal and professional development

Again, at the end of the session each group reported back to the main room and a discussion was had about the ideas put forward and further suggestions made.

The day was wrapped up by outlining the next steps for EPSRC – the design of a training and skills call specifically for QT.

7 Summary

Whilst all delegates were PDRA's there was a wide variety of experience and backgrounds represented in the audience and this was reflected in the discussions during the two half day sessions. There was a clear appetite for more career development support and information about fellowship opportunities for those in PDRA placements from all present but differences in the type and format wanted, depending on experience.

Specifically more information from EPSRC was requested on:

- Applying for fellowships
- What is a fellowship?/Pathways to career advancement
- Networking opportunities

Delegates enjoyed being part of QT research efforts and wanted to stay in academia and felt that the UK offered a dynamic environment for those active in the QT field. The UK was seen as having a good, strong relationship between academia and industry. Many attendees were interested in collaborating with industry and felt it important to develop links that would support and help them effectively realise their research plans. Building relationships with other potential academic partners, both within the UK and abroad was also seen as desirable.

Whilst most attendees were keen to stay within academia many were concerned about the lack of long-term prospects and the problems that the short-term contracts available created when looking to establish themselves both personally and professionally. Having a clear path to a permanent position was seen as highly desirable.

Many of those present were experimentalists and raised the issue of the capital required and time commitment required to build a new experiment from scratch. This was seen as a significant barrier to becoming an independent researcher and growing a new research group. There was discussion around the practicalities of using existing equipment to carry out experiments whilst retaining autonomy.

Balancing the requirement to teach with the desire to pursue research brought out a number of points of view. Some delegates wanted, at least for a period, to focus entirely on their research. Many felt they wanted to improve their teaching and lecturing skills and there should be more training on offer to do this.

There was some concern about both the impact of COVID and the unknown future of the QT Hubs on future careers. Many felt that COVID had set them back in terms of career development and that they would have to wait longer for advancement. The status of the QT Hubs past phase 3 was also mentioned as raising doubts about the permanency and stability of available positions. Concerns were also raised about key people in the field leaving for other positions and to work for spin-outs, meaning there could be a potential talent gap.

Knowledge transfer skills, outreach and public engagement were felt to be of particular significance in QT due to close working relationships with industry but delegates felt they weren't generally recognised as important when applying for grants and fellowships. The amount of time that PDRAs spend supervising group work in the laboratory and managing QT Hub activities was also felt to be under appreciated.

The size and scale of the QT Hubs was seen to be both a positive and negative. On one hand it meant a thriving research eco-system but it also meant it was challenging to establish research independence, especially for experimentalists wishing to do their own research.

Attendees largely seemed confident in their technical and research skills but were keen to develop soft skills. Particular skills that delegates wanted to develop included:

- Networking
- Project management
- Business development
- People management
- Community engagement/outreach

The importance of mentoring from a more senior academic external to the PDRAs research group was discussed in some depth and felt to be crucial to successful career development, giving support and guidance in taking their next career steps. The potential for mentoring from an industrial partner was also considered to be of significant benefit.

Overall delegates felt there was insufficient time dedicated to developing their own skills and that having allocated time to focus on their training needs would allow them to progress their career in specific ways suited to their needs. The need for more structured career development was also identified by delegates who felt that the route to becoming an independent researcher was often not very clear.

When it came to building an ideal career package the following topics were discussed:

- Length

- Either: short term 1-3 year funding, for those just starting out, or wishing to carry out an experiment on existing equipment, or to explore an idea before committing to a larger project
- Or long term 4-7 years allowing time to explore and develop research ideas and, if an experimentalist, to build an experiment and get it working
- Industry collaboration in a number of forms e.g. partnership, mentorship, secondment
- Partnerships with other academic researchers, both in the UK and abroad
- The opportunity to supervise PhD students
- Support for visa applications
- Flexibility to accommodate changes to family circumstances
- A hybrid semi-independent research model, where there is a structured move to research independence
- Different streams for theoretical and experimental work.
- Mentoring
- Career stability is an important concern
- Foster networking and community building
- The name of the award should be recognised internationally
- Criteria should recognise the full track record of an applicant not just publication history
- The potential to extend beyond the initial award period
- Being part of a QT cohort to encourage and support networking
- Balance between teaching and research commitments

8 Next steps

This report will be emailed to attendees and published on the [UKRI website](#). The findings from the workshop will be used to develop a bespoke Quantum Technology career development fellowship, to be launched summer 2021. Opportunities can be found in the UKRI funding finder <https://www.ukri.org/opportunity/>. This is the first stage in our training and skills strategy. We will continue to develop this strategy, across the breadth of career stages, over the next two years.

9 More information

Training and skills are a key strand of the [National Quantum Technology Programme Strategic Intent](#), published November 2020.

National Quantum Technology Programme website <https://uknqt.ukri.org/>

EPSRC Open fellowships <https://www.ukri.org/opportunity/epsrc-open-fellowship/>

EPSRC publications <https://epsrc.ukri.org/newsevents/>

How long have you worked with your current hub, including any predecessor?

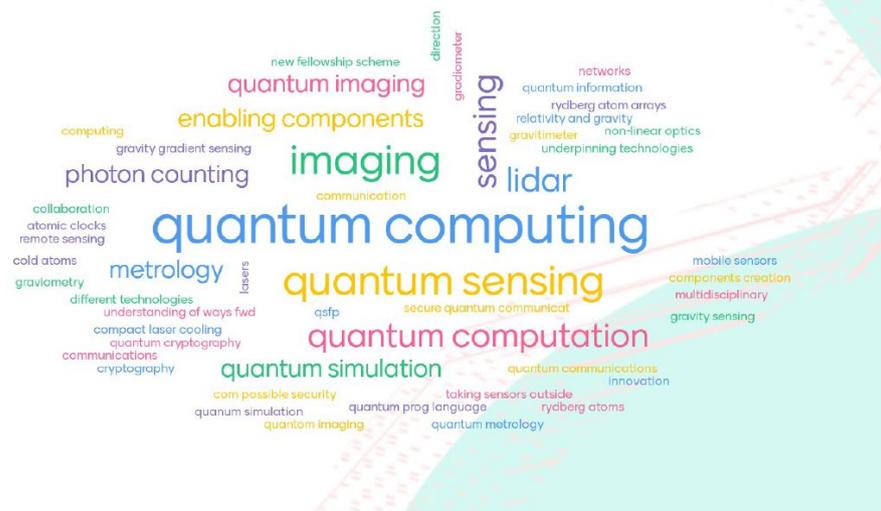
<1 year	1 year	2 years	3 years	4 years	5+ years
5	4	4	1	5	4

Have you applied for a fellowship or other grant as PI?

Yes (12), No (12)

What do you think are the most exciting areas of Quantum Technology?

What do you think are the most exciting areas of Quantum Technology?



What are you hoping for from this workshop?

A clear pathway to career advancement, guidance on successful fellowship applications and fellowships in general, understanding new opportunities, networking, guidance on routes to careers in Quantum Technology were the main topics.

Second Q&A session with UKRI and EPSRC fellows

This session focused on the career journeys of the fellows, offering advice and guidance on career development to those attending.

Second Mentimeter session

This was designed to get an understanding of the career aspirations of those in the room and to get the audience thinking about some of the questions we wanted to ask them in the breakout sessions the following day. The answers, taken together, suggest that participants were generally confident in their technical research skills but were keen to develop softer skills such as business development, line management, communications and networking, project management and routes to research independence.

Do you want to stay in academia or move to another sector?

Academia (8), Industry (1), Mixture (4)

Do you plan on staying in your current research area?

QT, same area (12); QT, different area (5); not QT (0); and unsure (3)

Would you like to stay in the UK?

Yes (13), No (0), Be international for a period but return to UK (5), unsure (3)

How do you feel about your career prospects?

I feel very positive about a career in QT 4.1/5

There are appealing QT opportunities within the UK 3.8/5

The QT hubs offer a career development route 3.4/5

ED&I is taken seriously by my hub 3.7/5

Impact of the pandemic

The pandemic has had an impact on my career prospects 3.9/5

I felt supported in my role during the pandemic 3.7/5

What skills do you feel strongest in?

Problem solving, supervision and project management all came out as the top skills. Collaboration, teamwork, teaching, experimental work, coding, critical thinking, people management, industry engagement, commercialisation and nanofabrication were all strong seconds. Other skills mentioned were largely more technical skills but included: entrepreneurship, engineering design, systems engineering, semiconductors, public engagement, networking, optics, single atom control, deep learning and artificial intelligence.

What skills would you like to develop?

Networking was the most voted for with grant writing, project planning, supervision, communication and entrepreneurship all getting a number of votes. Other skills mentioned included: algorithm design, theory for metrology, preparing lectures, writing, time-management, confidence and life-work balance.

What skills would you like to develop?



Where do you think there are gaps in career development provision for you?

Opportunities to develop independently/independent ideas away from the PI, challenging in a field that requires large expensive equipment (this subject was mentioned repeatedly)

Opportunities for industry secondment/collaboration

Limited access to training

Mentorship beyond PI

No teaching development or progression

Knowledge transfer projects don't translate into publications but take up a large part of our work

6.2 Outputs from second day

The second day was broken into two sections with breakout sessions. The first session followed on from the previous day and asked participants to discuss, within groups, their career aspirations and identify any potential issues. There were 4 groups with attendees allocated so there were a mix of hubs and universities in each group. Outputs were captured using Miro, an online whiteboard. Each group had a facilitator, an EPSRC Miro expert and an EPSRC note taker. Each group used the boards differently and worked in different ways.

Breakout 1 – career ambitions and barriers

Breakout session 1, group 1

The key points that came out of this

General points	NPL offers an intersection between academia and industry
	Real collaboration with industry is a goal – joint employment options
	There is pressure to get a fellowship to stay on the academic career path
	Enjoy being part of research efforts in key QT topics
	Scale and nature of QT Hub projects make it difficult to develop independence
	The community around the QT Hubs makes it attractive to stay in the UK. The critical mass and large collaborations make UK attractive over other European opportunities
	Potential to work abroad for a period before returning to the UK is attractive
	A more permanent academic position is desirable but the opportunity to “test out” industry would be of interest
Challenges	Balancing teaching and research
	Need to develop teaching and supervising capability alongside maintaining research programme
	More official support for development of teaching skills
	Clear expectations and structure around teaching for PDRAs
	Overall workload and responsibilities

Barriers to staying in QT in the UK	Without a permanent position it is difficult to supervise PhD students
	Cannot apply for grants as PI or Col as a PDRA
	In other countries PDRAs can apply for grants
	Situation changing as the QT Hubs come to an end
	Key people in the field are leaving for other positions or spin-outs
	Opportunities to apply for other funding is limited
	Need for stability and permanent positions
	PDRAs do not get credit for the leadership and research they do
Concerns	Visa constraints
	Named EPSRC grant would make visa easier
	Names of awards and fellowships matter, especially internationally

Breakout session 1, group 2

Are there any issues that you anticipate preventing you pursuing a QT career in the UK?	There is a general desire to stay in the UK but chances are viewed as slim
	If a fellowship came with a tenure track it would be viewed as more attractive
	Having the chance to partner/work with industry or another academic partner would be desirable
	It takes a lot of time and money to build an experiment and get it working. Opportunities to keep working on the same experiment or group but with more autonomy would be desirable
	It would be good to have a clearer path to a permanent position
	Lack of long term prospects
What do you see as the next stage in your career?	Academia
What skills or experience are	Improving networking skills – particularly forging new industry links

important to you in your career development?	
What support would help you develop in your career?	Longer and more structured PDRA positions that prepare us for full academic positions

Breakout session 1, group 3

What attracted you to your current role?	PhD taught me I love lab work and experimental design
What skills or experience are important to you in your career development?	Making time to pursue own independent career is challenging, especially after the pandemic
	Management skills, securing funding, building networks of collaborators
Are there any issues that you anticipate preventing you pursuing a QT career in the UK?	Bringing the technology research to the right TRL so that it is attractive to industry is challenging
	Concern from researchers in QT about the transition from academia to industry
	Age related issues?
	Prejudice from industry towards long-term academics?
	Pandemic has affected career and publications – will have to be more patient for an academic career
	Lack of recognition for outreach activities and public/industry engagement
What do you see as the next stage in your career?	Keeping options open with industry
	Establish independent research that is clearly separate from supervisors
	Identify the global direction of my research
	Establish differences/distinction from my research advisor
	Develop portfolio for fellowship application
Is staying in the UK attractive to you?	It is attractive as long as I have a job I like and a secure position

	UK is one of the leading countries in scientific research
	Staying in the UK is comfortable
	Hub work has been about developing UK QT capability
What support would help you develop in your career?	Support from hub/line manager in making a network
What opportunities are available to you to develop your career in the UK?	NQCC provides great opportunities in QC
	It seems there are many possibilities to express your needs for the future career development in the UK
	Dynamic Quantum environment
	Good, strong relationship between academia and industry

Breakout 1, group 4

General application guidance	Advice/session on this
	RO very helpful
	What is a reasonable amount of money?
	Guidance for experimental proposals
	How to get to work leading when capital cost is expensive
	Difficult to know where to start and how ambitious to be
	Collaboration essential and has been challenging to develop during COVID period
	Guidance for experimental proposals
Fellowship	Industry focused impact
	Mentoring in industry
	Support is reactive rather than proactive
	Access to senior leaders in the field is desirable
	Low success rate – takes a lot of energy to apply
	Time scheduled for supervisors to give support and career advice
	Just want to focus on work
	Closer integration with industry
	Session to talk through reasonable grant costings
	Wider talk on fellowships
	Field complex and collaboration is key
	Lack of structure for career development for PDRAs – introducing a formal framework would be helpful
	Mentoring outside PI
Teaching expertise	

Personal life – commitments, stability
Time – it takes time to settle into a role and establish yourself
Implications of Brexit?
5 years would give stability
FLF time length, 7-8 years gives time to develop
Commitment to fellow from the host institutions to meet objectives
Living allowance for Oxford and Cambridge
Short contracts are difficult when starting a family
Stability – not keep moving family for short term posts
Structured info on career development for PhD students
More information for RAs on career development
Dedicated time for mentoring
Worry over areas over promising and money will stop

Breakout 2 – Ideal Career Development Package

Breakout 2, group 1

What's unique in the QT community that we can incorporate into fellowships?
Proposal evaluation differences between types of project and number of first author papers
Can vary between fields
Factor in time to build up equipment set up, career development and growing research group
Following URF scheme – possible extension following review, start consolidating career
Parental leave is important <ul style="list-style-type: none"> Shared parental leave Flexible leave Practicalities of PhD supervision for parental leave Flexibility to change working hours and pattern Compare to Dorothy Hodgkin fellowship
Separate out theory and experimental proposals as requirements are different. Different streams with different criteria? Separate out by TRL?
Duration? Longer than a PhD and factor in time for recruitment. 5 years seems practical
50% minimum commitment
Should be careful about asking the university to contribute too much. Fellowships should be about establishing independence.
Pitch at experienced PDRAs, especially experimentalists – need experience to lead their own labs and show research independence.
Include relocation experiences
Harder to show independence due to capital outlay and resources
Hubs have seen shift towards commercialisation. What would the focus of phase 3 hubs be? Fellowship could look at new research themes and more commercialisation
Applicant can choose time commitment
10% of time on fellowship for working on other grant proposals or projects to enable career development
Time dedication changes with career stage?
Around 80% of time funded on fellowship seems enough leverage on university
Commercial aspects to QT is a draw for many researchers
Want to request studentships as part of fellowship
Talent retention - how to evaluate track record and contribution to NQTP as part of application process.

PDRAs contribute heavily to management and running of Hub activities
Retention for hubs is key – working across both industry and academia. Already seeing some loss due to future stability
An historic problem is funding and not making fellowships available in QT
Level of experience post PhD varies as projects are variable lengths

Breakout 2, Group 2

Mentoring
Capital for projects needing to start from scratch (experiments)
Enable a gradual transition from current work to setting up own group and equipment
Ability to extend x+y format
Aimed at more experienced PDRAs
Higher pay
University commitment assessed on how beneficial it will be for the candidate
Flexible % on fellowship to allow involvement in other grants
Min of 4 years
PDRAs costs allowed
Significant budget for experimental kit
PhD students
Being part of a QT cohort would enable networking

Breakout 2, group 3

Training vs research	I have observed becoming an independent researcher and having the expectations of teaching full courses for the first time is a real strain
	Less teaching duties in the first year to have time to focus on establishing research
	30% teaching, 70% research
	Research should be important
Personal and professional development	Allow skill training WP
	People and conflict management training
	Leading towards securing a permanent role
Portability of award	Needs to be transferable between institution for leverage
	Research idea taking up 50% of fellowship time commitment
	Portability is nice but it is an advantage working in a research group for sharing equipment which can be prohibitively expensive
Community building/networking	Community engagement
	Outreach
	Industrial engagement
	Knowledge transfer is key to QT work
	Public outreach involved in fellowship
Length	Quick, 2 years package as a step up to later programmes
	Tailored to suit project scope
	An experimental group and lab require a minimum of 5 years to set up
	At least 3 years

	3 years plus review and possibility of a 2 year extension focusing more on industry engagement
	>4 years for world leading experiments
	5 years with a possible extension period
Other	Visa fees reimbursement
	Support for change in family circumstances – PDRAs often at a stage where they are trying to establish a family as well as a career
	Allow fellowship to be paused for time in industry
	Allow “co-fellowships” with two PDRAs from same/different institutions to Co-I

Breakout 2, group 4

Key opportunities 1	Pilot studies, small grants for 1 year to shape an idea and examine feasibility
	Shared access to equipment and a capital budget
Key opportunities 2	Options for secondments in other institutions, funding to enable this
	Transfer of ideas to industry
	Time for contact with industry
	Network of current fellows to help with process
	Opportunity for teaching if fellow wishes
	Assessment criteria should support different career paths
Key opportunities 3	Personal research
	Supervision
	PDRAs and studentship attached
	Mentoring and mentor support
	Semi independent/hybrid model
Length	5-6 years, flexible
	Short fellowship to give time to develop independent ideas
	Open fellowship judged by merit
	Trade of excellent ideas/short term contracts
	Balance to find right level of independence
	Basic starter package for PDRAs. Ability to apply for travel funding, equipment. Can apply annually