

Academy of Medical Sciences' response to US National Academy of Sciences
Next Generation Researchers Commissioned Papers on International
Comparisons

Annex I: Transition to independence schemes

Annex II: Academia-industry mobility schemes

Annex I: Tabulated summary of research grant schemes and fellowship awards available to biomedical researchers transitioning to independence

The critical career step of transitioning to independence is supported by multiple funders in the UK mainly via two routes: **lectureships and fellowships**. Both groups of researchers can then apply for research grants. Fellowships provide salary support, whereas research grants do not. The table below provides a list of grants and fellowships (table A and B) available to UK biomedical researchers; some are exclusive to non-clinical or clinical researchers whereas others are open to both. The table below is not an exhaustive list but intended to give a flavour of the type of awards available.

Table A: Research Grants

Funder	Scheme	Clinical/Non-clinical	Eligibility criteria	What it provides	Demand/award rates
Academy of Medical Sciences	Springboard	Non-clinical	Applicants must: <ul style="list-style-type: none"> be within three years of their first lectureship (or equivalent) post in one of the 40 participating Higher Education Institutions. not be in receipt of other substantive funding, excluding personal salary and not hold a clinical contract. 	<ul style="list-style-type: none"> £100k flexible funding for two years. Awards can cover: research consumables, equipment, research assistant time, contribution to the costs of a PhD student or postdoctoral researcher, travel for meetings and collaborations. Award holders are invited to join the Academy's one-to-one mentoring scheme and career development programmes. 	Around 25% of full applications were awarded, which was limited by the funds the Academy had available rather than excellence. Many more were above the bar for funding.
	Starter Grants for Clinical Lecturer	Clinical	Applicants must: <ul style="list-style-type: none"> be a research-active Clinical Lecturer (CL) hold a PhD or MD. hold a clinical contract. 	<ul style="list-style-type: none"> Up to £30K for a maximum duration of two years Covers the costs of research consumables to help CLs gather data to strengthen their bids for longer-term fellowships and funding. 	Receive c120 applications per year and c50 awards are made over two selection rounds.
Biotechnology and Biological Sciences Research Council	New investigators	Non-clinical	<ul style="list-style-type: none"> Applicants must be within be within three years of the start date of their first appointment as a newly employed university lecturer, researcher in Research 	<ul style="list-style-type: none"> Up to 3 years support. Start-up costs of the applicant's laboratory. 	2015/16: <ul style="list-style-type: none"> Success rate = 21%.

			<p>Council Institutes (at a level equivalent to lecturer), or fellow (at a level equivalent to lecturer)</p> <ul style="list-style-type: none"> Applicants must not have received competitive research funding from any source, as a PI, that included post-doctoral research assistant staff support costs. 		
Medical Research Council	New investigator research grants (NIRG)	Clinical and non-clinical	<p>NIRGs support individuals seeking to transition to independence through their first grant as a PI. There are no eligibility rules based on years of post-doctoral experience, and time on the research grant (~50% of contracted working time) is combined with other activities such as teaching, other research, or clinical duties.</p>	<ul style="list-style-type: none"> Up to 50% salary, research staff, consumables, equipment. 3 years with part-time options. 	<p>2015/16:</p> <ul style="list-style-type: none"> 135 applications received. 21 awards made. 21% success rate.
Royal Society	Research grants	Non-clinical	<p>Applicants must:</p> <ul style="list-style-type: none"> be within 5 years of the start date of their first permanent or limited-tenured academic position. hold a PhD. 	<ul style="list-style-type: none"> Up to £15k 'seed corn' funding. Up to 1 year support. Specialised equipment and essential consumable materials, and to support essential field research. 	<ul style="list-style-type: none"> Typically receive c300 applications per round. Typically award c80 per round (across the whole remit of the Royal Society). Typical success rate is 25-30%.
Wellcome	SEED Awards in Science	Clinical and non-clinical	<p>Applicants must:</p> <ul style="list-style-type: none"> have completed a PhD or an equivalent higher degree 	<ul style="list-style-type: none"> Up to £100,000 for a duration of up to two years. 	<p>Applications considered three times a year. For the latest round:</p>

			<ul style="list-style-type: none"> be based at a host organisation in the UK, Republic of Ireland or an eligible low- or middle-income country (apart from India) 	<ul style="list-style-type: none"> The support includes research expenses, including research assistance. <p>Seed Awards in Science cannot be used to pay researcher's personal salary costs.</p>	<ul style="list-style-type: none"> Total applications received = 234 Total eligible = 186 Total awarded = 20
--	--	--	--	--	---

Table B: Fellowships

Funder	Scheme	Clinical/Non-clinical	Eligibility criteria	What it provides	Demand/award rates
Academy of Medical Sciences	Clinician Scientist Fellowship *offered by multiple funders (see footnote below)	Clinical	Applicants must be: <ul style="list-style-type: none"> medically qualified researchers, with a PhD or MD in a basic science or clinical/health related subject. either approaching the end of their training or having recently been awarded consultant status. 	<ul style="list-style-type: none"> Five years' funding to cover personal salary costs. An allowance for research expenses. A leadership development programme. Mentoring from an Academy Fellow. Extensive opportunities to network with experts and peers. 	26 clinicians supported over four rounds of funding.
Cancer Research UK	Advanced Clinical Scientist Fellowship	Clinical	Applicants must have: <ul style="list-style-type: none"> obtained a higher degree (MD/PhD) in a cancer-relevant research area. obtained their Certificate of Completion of Training and hold consultant status at least 3 years postdoctoral experience. 	<ul style="list-style-type: none"> Salaries and associated running expenses for the Fellow, one postdoctoral researcher and one research technician Up to 5 years 	3 rounds since the scheme started in 2016: <ul style="list-style-type: none"> May 2016 - 4 applications, 2 successful Nov 2016 - 6 applications, 3 successful

					<ul style="list-style-type: none"> May 2017 - 2 applications, 1 successful
Medical Research Council	Career Development Awards (CDA)	Non-clinical	CDAs support postdoctoral researchers aiming to make the transition to independent investigator. There are no eligibility rules based on years of post-doctoral experience. Fellows are expected to spend 100% of their working time on the award.	<ul style="list-style-type: none"> Salary, research staff, consumables, equipment. Up to five years' support. Applicants are expected to take advantage of the full five years' funding available. 	<p>In 2015/16:</p> <ul style="list-style-type: none"> 99 applications received 9 awarded 9% success rate
Royal Society	University research fellowship (URF)	Non-clinical	<p>Applicants must:</p> <ul style="list-style-type: none"> hold a PhD. be at an early stage of their research career with between three to eight years of actual research experience since their PhD 	<ul style="list-style-type: none"> Duration: 5 years, followed by a potential extension of 3 years Covers a research fellow's salary costs, estates costs and indirect costs. In addition, a contribution to research expenses (£13K in year one and £11K thereafter). 	Approximately 33 awards offered per year
Wellcome	Sir Henry Dale Fellowships	Non-clinical	<p>Applicants must:</p> <ul style="list-style-type: none"> have a PhD have significant postdoctoral research experience. 	<ul style="list-style-type: none"> Duration: 5 years, followed by a potential extension of 3 years Salary and research expenses covered 	<p>In 2016/17 over 3 rounds:</p> <ul style="list-style-type: none"> Full applications received: 197 Number awarded: 39
	Clinical Research Career Development Fellowship	Clinical	Applicants must be postdoctoral medical, dental, veterinary or clinical psychology graduates.	<ul style="list-style-type: none"> Provides support for up to 8 years and the flexibility to balance research and clinical responsibilities. The Fellowship is split into two stages, with up to £1 million of funding for each phase. Progression from stage 1 (exploration and consolidation) to stage 2 (early independence) involves a formal 	<p>Two rounds so far.</p> <p>For Round 1 received 41 full applications.</p> <ul style="list-style-type: none"> 24 Stage 1 applications, of which 4 were awarded, 4 withdrew before interview and 16 were not awarded.

				<p>application and competitive interview. There is no set duration for each stage. For those holding the fellowship full time:</p> <ul style="list-style-type: none"> o Neither stage can be held for longer than 5 years o The total length of the fellowship cannot exceed 8 years. <p>Candidates who are ready to lead an independent research programme can apply to stage 2 directly, without doing stage 1 first.</p>	<ul style="list-style-type: none"> • 17 Stage 2 applications, of which 4 were awarded and 13 were not awarded. <p>Round 2 received 63 full applications.</p> <ul style="list-style-type: none"> • 41 Stage 1 applications, of which 6 were awarded and 35 were not awarded. • 22 Stage 2 applications, of which 5 were awarded and 17 were not awarded.
--	--	--	--	---	--

* **Clinician Scientist Fellowships** were developed by many funders as a result of the Academy's report, '*The Tenured Track Clinician Scientist: a new career pathway to promote recruitment into academic medicine*' in March 2000. These awards can be funded through external bodies such as Cancer Research UK, MRC, Wellcome and NIHR.

Annex II: Academia-industry mobility schemes

There are a number of UK-wide schemes that exist to promote mobility between industry and academia. Tables 1 and 2 are not exhaustive lists, but are intended to highlight a flavour of the schemes provided by UK funders.

Table 1: Examples of industry-academia mobility grants available from major funders, Research Councils, UK National Academies and learned societies

Organisation	Name of grant	Aims/remit	Length	Maximum award	Number awarded
Royal Society	Industry Fellowship	Academic or industry scientists (inc. engineering, chemistry, bioscience) to work on a collaborative project. <i>Note: The scheme receives a huge diversity of postdoctoral candidates; no specific age/career stage stands out. Previous candidates have included one candidate who was 1 year out of her PhD, and many Professors have been Fellows of the scheme.</i>	2 years full time or 4 years 50% part time.	Basic salary plus £2,000 to cover research cost per year.	7-13/year. Receives 40-70 applications a year.
Royal Society of Edinburgh	Enterprise Fellowship scheme	Academic and research staff, postdoctoral researchers, postgraduates and graduates with relevant experience to develop and launch innovative enterprises in Scottish or UK bioscience (depending on the funder).	12 months full time.	£37,000 salary support for a year plus NI and pension costs. Additional £10,000 for development of the innovation.	~8/year.
Royal Academy of Engineering	Industrial Secondment scheme	Early-mid career academics to undertake a project in industry.	6 months full time or 12 months part time.	£30,000 towards salary cost.	~8-10/year.
	Enterprise Fellowships	Engineering academics (PhD and above) to develop a spin-out business around their technological idea.	12 months full time.	£35,000 salary support for a year. Additional £25,000 for development of the innovation.	~8/year.
	Visiting professors	Senior industry practitioners to deliver face to face teaching and mentoring at a host university.	Three years (one day/month commitment).	£10,000 per year over three years.	~20/year.

	Sainsbury's Management Fellowships	Professional engineers to attend a full time MBA programme at one of 14 major international business schools.	12 months full time.	£30,000 to cover tuition fee.	~10/year.
	Visiting teaching engineers	Industrial engineers or technicians to deliver face to face teaching and mentoring at a host college.	1 year (10 days commitment from technician)	£2,500 award to the college.	
Biotechnology and Biological Sciences Research Council	Industrial Partnership Awards	Academic-led, responsive mode grants that have significant industrial involvement. <i>Note: A recent evaluation of the scheme recommended that BBSRC should consider how it might adapt it to address any barriers which limit participation by SMEs and other underrepresented industry.</i>		Industry partner(s) contributes in cash at least equivalent to 10% of the full project costs.	128 projects funded since the scheme's inception in 2001.
	Knowledge Transfer Partnerships (KTP)	KTPs serve as a mechanism to transfer knowledge and to develop graduate and postgraduate personnel for industrial careers. Each partnership employs 1 or more high-calibre KTP Associates (early-career researchers) to work on an innovative project within industry. Associates are jointly supervised by the participating industrial and academic partners.	Between 1 and 3 years	Innovate UK part funds the cost of the project. Annual costs of a KTP average about £60k. A small or medium-sized business will contribute around a third of total project costs – or £20k on average. A larger company is responsible for about half of total project costs – or £30k on average.	In 2011-12, for every £1m of Government money invested in KTPs: 30 new jobs were created and 279 company staff were trained.
Medical Research Council	Industrial CaSE studentships	Provide students with experience of collaborative research with a non-academic partner. From 2016, MRC will allow the recruitment of clinicians to undertake CaSE studentships.	3 -4 years.		30-35/year. Receives 120 applications/year.
	Proximity to Discovery: Industry	MRC will give £3 million to support universities to help develop new collaborations with industry. Allows two-way short term knowledge and people	18 months.	Up to £250,000.	17 awards made in 2 rounds since the scheme

	Engagement Fund	exchange. Intentionally broad to encourage applications from all career stages. Applications do not need to specifically address a translational aim. Can be used for projects that would enhance academic understanding of industry or vice versa.			started in 2014.
	Confidence in concept	Institutions to be used flexibly to support the earliest stages of multiple translational research projects before seeking more substantive funding.		Annual awards of £250k-£1.2m.	22 awards made since 2012.
Wellcome	Pathfinder awards	Awards fund discrete projects from applicants in the UK and Republic of Ireland. Partnerships between academia and industry based anywhere in the world. Majority of applicants are non-clinical researchers. <i>Note: The eligibility was originally just for partnerships between academia and industry in low and middle-income countries but it was broadened to include high income countries and individual awards in the UK. The original criteria lead to a very low number of applications and the criteria was widened to increase the impact of the scheme.</i>	Up to 18 months.	£100,000 - £350,000. Costs can include staff and research expenses. Lead applicant salary not offered.	<i>Demand was originally around 5-10 applications per round with 2 rounds a year. Since the criteria were changed demand has been increasing 25% per round with 104 in the most recent round.</i>
	Interdisciplinary Programme for Clinicians in Translational Medicine and Therapeutics (TMAT)	Initiated in 2009, this was a one-off £11 million initiative by Wellcome to promote clinical pharmacology and collaboration with industry. Attracted clinically active candidates at several levels of seniority, ranging from MB PhD students to clinical lecturers. This scheme has now closed.		Each institution received £2.75 million.	4 institutions.

Cancer Research UK	Biotherapeutic Drug Discovery Project Awards	<p>Early career researchers, established independent researcher, both clinical and non-clinical researchers.</p> <p><i>Successful applicants have the opportunity to access the CRUK-MedImmune Alliance Laboratory (CMAL). CMAL provides access to MedImmune's proprietary phage display library.</i></p>	Typically 12-36 months.	£100,000 per annum.
Encompass (collaboration between the Universities of Glasgow, Strathclyde, Aberdeen and Stirling)	First Step Awards	Financial support for small projects between the university and Scottish small and medium-sized enterprises (SMEs). The funding is used to buy out academic time spent on the project. SME partners can contribute in kind.		£5,000 per project.

Table 2: Examples of mobility grants and partnerships supporting mobility driven by industry (big pharma and small biotech)

Organisation	Name of programme/partnership	Remit/Notes
GSK	DPAc - discovery partnerships with academia	Academics come to GSK with a concept for a potential medicine based on their research. GSK Panel judges the proposal. If successful, GSK collaborates to explore the concept and provides GSK resources/equipment to accelerate drug discovery.
	GSK/Crick Biomedical LinkLabs	A collaboration was established in 2015 between Francis Crick Institute and GSK. A key focus of the collaboration is the development of both Crick and GSK scientists. Scientists from Crick and GSK work side by side on projects, locating scientists at either location to take the project forward which enables effective knowledge development and shared understanding. Leading scientists from GSK second into the LinkLab for 12-18 months, allowing them to immerse themselves in a new environment at the Crick and working in different areas of science.
	Immunology Catalyst postdoctoral training programme	GSK selects leading academic immunologists to join their R&D facility in Stevenage, UK, where they work alongside GSK's scientists while pursuing their own independent research programmes focused on basic immunology questions.
	R&D postdoctoral global training programme	Training aims to prepare post-docs well for a career in academia, industry, a regulatory or non-profit healthcare organisation.
	Stevenage Bioscience Catalyst	Joint venture between the Department for Business Innovation and Skills, GlaxoSmithKline, Wellcome and Innovate UK. Their open innovation campus offers access to equipment and facilities that would otherwise be beyond the reach of small or medium-sized companies.
AstraZeneca	GLAZgo Discovery Unit	A collaborative project between AstraZeneca and the University of Glasgow has established the unit within the University's Institution of Infection, Immunity and Inflammation. Investment through the unit will support ten staff and PhD students. Furthermore, a two way secondment programme has been initiated between the university and AstraZeneca.
AstraZeneca	University of Cambridge	In 2015, AstraZeneca and the University of Cambridge announced three new joint schemes to support more than 80 PhD scholarships and 8 clinical lectureships over the next 5 years spanning translational science, basic and clinical research.

		Students will be appointed by the University of Cambridge and will be supported by an academic supervisor from the University and an industrial supervisor from AstraZeneca or MedImmune.
Heptares	ORBIT	ORBIT (Opportunities in Receptor Biology for Industrial Translation) set up in January 2016 to fund collaborations with academia. Heptares is committing up to £5 million over the next three years to fund this new initiative. The first collaboration under this new initiative is with academics at Imperial College London's National Heart and Lung Institute (NHLI).
Astex pharmaceuticals	Sustaining innovation postdoctoral fellowships	Post-doc training programme for structural biologists/chemists/biophysics/bioinformaticians. Concept: rather vague, 'offers participation in collaborations with world-leading academic groups'. Uses 'fragment-based drug design' for drug discovery.
Evotec	Yale/Open innovation	Open innovation alliance between Evotec and Yale University. The partners have defined a wide range of scientific fields where they will jointly assess and potentially pursue novel assays, screens and models but in particular exploratory drug targets and compounds.