



IMPACT REPORT

EXSEL Scholarship Programme

heartresearch.org.uk/research

Supporting a new generation of research excellence

In 2006, Professor Shervanthi Homer-Vanniasinkam and Dr Karen Lee decided to launch a programme at the University of Leeds designed to foster the development of research skills and knowledge for undergraduate medical students. Originally designated as the Leeds Undergraduate Research Enterprise (LURE) scheme, by 2013, it had evolved into the Excellence in Scholarship, Enterprise, and Leadership (EXSEL) programme, which continues to run to this day.

The standard curriculum for undergraduate medicine, particularly at Leeds, leans heavily towards the clinical elements of being a doctor, and contributes to Leeds's reputation as a highly successful medical school. However, for some, this means that any potential interest in research or the academic side of medicine is unfulfilled, and it is this gap that the EXSEL programme aims to address.

EXSEL is a unique, innovative, scholarship scheme that facilitates students who may have an interest in research. Awarded during the second year of their studies, EXSEL scholarships enable students to do a research project in the summer weeks between their second and third year. The support, however, is ongoing. Students remain EXSEL scholars until the end of their time at Leeds, gaining access to a range of research opportunities, alongside a network of clinicians, academics, and fellow scholars.

The current co-directors of EXSEL are Professor Shervanthi Homer-Vanniasinkam and Dr Simon Howell. They have championed EXSEL in all its forms, remaining inspirations and providing unwavering support to its scholars. In speaking to them both, their passion and commitment to the programme shines through.

“

I had supervised many medical students during their intercalated BSc year. It became apparent to me that some of these students would benefit significantly from a more extended period of funded research time

It is hugely gratifying to see the scholars extend themselves and reach heights one would not normally envisage. I am constantly reminded of the saying: 'A mind that is stretched by a new experience can never go back to its old dimensions'.

Oliver Wendell Holmes, Jr.



Professor Shervanthi Homer-Vanniasinkam, EXSEL Co-Director

Clinical Sub-Dean of Leeds Medical School

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I think the ethos of EXSEL remains what it has always been. It's about generating a supportive academic family and taking people who have real potential and helping them realise that potential.

It is not just about raising aspiration, but about giving people the confidence to believe that they can do it.



Dr Simon Howell, EXSEL Co-Director
Senior Lecturer in Anaesthesia

An initiative built on ambition

Heart Research UK has partnered with the EXSEL scholarship programme since its inception, contributing over £400,000 to date. EXSEL champions many of the ideals on which Heart Research UK was built, including excellence in medical education, improving the care and treatment for patients, and, above all, a commitment to a future without heart diseases.

Whilst EXSEL means many things to many different people, the people for whom it is most special are of course, its students. To them, it is quite simply a programme like no other, as described by Dr Tobias Mill, the Director of the EXSEL alumni programme:

EXSEL is first and foremost a community

Paul Graham (who is a personal hero of mine) wrote, "Ambitious people are rare, so if everyone is mixed randomly, then the ambitious ones won't have many ambitious peers. When you take people like this and put them together with other ambitious people, they bloom like dying plants given water".

Paul describes the exact way EXSEL works. EXSEL causes ambitious medical students to bloom; you will see the proof in this document's outcomes.

Your support means gifted, and driven students can develop into fantastic healthcare thinkers, researchers, and technologists.

For that: Thank You.

Since the first scholars in 2006, over 50 EXSEL scholars have graduated and have ventured into careers as researchers, clinicians, and entrepreneurs, both in the UK and abroad. The impact of this programme on its scholars can be described best in their own words, and so the following interviews were conducted with alumni of the EXSEL programme to explore their experience as scholars, as well as highlight the incredible careers they have gone on to have.



From scholar to supervisor

Dr Jonathan (Jonny) Batty

EXSEL Project

Jonathan admits he had limited interest in research, but on entering medical school heard about the Leeds Undergraduate Research Enterprise (LURE) Programme, the programme that would be renamed EXSEL several years later.

Originally wanting to be a surgeon, and therefore drawn to surgical research, Jonathan's interest was instead captured by a project run by Professors Alistair Hall and Tony Balmforth concerning cardiovascular pharmacogenetics. Pharmacogenetics is the study of how your genes affect the way your body responds to medications, and this study focused specifically on the use of a particular drug, a type of beta blocker, on patients with heart failure. The programme's findings highlighted that a person's genetics can determine their reaction to the drug. This enabled the team to predict someone's response based only on their genetic code.

Unfortunately, this drug was never licensed for use in the UK for heart failure, and so the research was never developed. It had however, given Jonny his first step into the world of medical research, as he explains:

"It really led me to start thinking not only that cardiology was really cool, but that I could contribute even though I was a junior medical student.... It was a real confidence boost to help with that study and have good outputs from it."

It also sparked an interest that went beyond the realms of cardiology, as he describes:

"I was still really interested in genetics and the thing that I didn't expect to like so much was the data related elements of it."

Working with large scale data sets, in this case the clinical trial data for over 600 people, had exposed Jonathan to the power of so called "Big Data" and how it could be applied to medicine. It has the potential to expose large scale patterns among patient groups, which in turn can lead to more personalised and effective treatments. Again, having discovered this interest, it was the EXSEL programme that encouraged Jonathan to pursue this, he explains:

"I think EXSEL was all about the inspiration and putting me into rooms with people that were a lot more knowledgeable than I was and had access to lots more data and exciting studies. Just seeing a bit of the scientific method really captured my imagination."

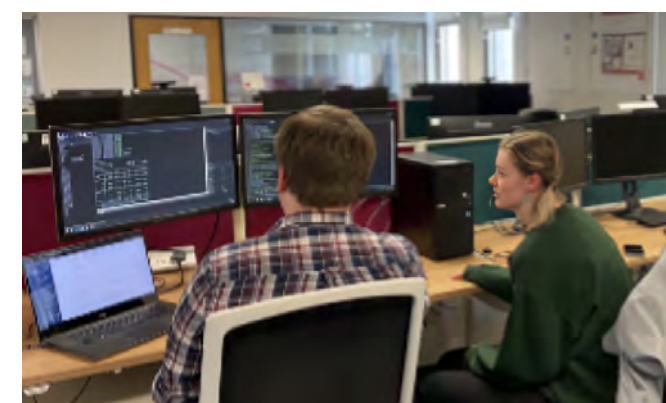
Undergraduate to PhD

Having graduated from Leeds, Jonathan moved to Newcastle to complete the Academic Foundation Programme, which allows junior doctors to engage in research whilst doing their foundation training in the NHS. Having completed this programme, he decided that rather than continue straight into specialty medical training, instead to pivot into further research work.

Supported again by his EXSEL supervisors, Jonathan applied for a Knox Memorial Fellowship which would provide funding to go to the USA for a master's degree. After a competitive selection process, he was successful and embarked on a master's in public health at Harvard. This opportunity allowed him to continue his interest in Big Data, whilst also exploring other topics such as biostatistics and epidemiology.

On his return, Jonathan spent a few years working as a cardiology registrar before transferring back to the University of Leeds to embark on his PhD. He is currently funded by the Wellcome Trust, one of the biggest medical research funders in the UK. Having explored the many ways in which data can be used in medicine, Jonathan's PhD harks back to his cardiovascular roots, as he describes:

"My PhD research is focused on improving outcomes and patients with myocardial infarction that have lots of concurrent long term medical conditions. I'm using large volumes of routinely collected healthcare data to see if particular groups that present with MI have disproportionately bad or good outcomes and what we can do to try and improve that."



Jonny and his EXSEL student, Olivia

Becoming an EXSEL Supervisor

Whilst Jonathan's journey to his current position has similarities to many other of his fellow EXSEL scholars, there is also something that makes him truly unique. He is the only one of the Heart Research UK EXSEL scholars to be both a scholar and a supervisor. His student, Olivia Carson, is a 2023 scholar, whose project focuses on using large scale data to explore which patients with heart failure are at greatest risk of other health problems. This information will then be used to tailor treatments and improve outcomes for patients.

Jonathan's enthusiasm to give back to the EXSEL programme is no surprise given the warmth with which he talks about his own supervisors as an undergraduate EXSEL scholar. To him, they have been two of the biggest influences on his life and career, as he explains:

"The decision to intercalate, to take a year out to do research, was based on the fact that I would get more time to work with Alistair and Tony and I'm still in contact with them. We went hiking in the lakes a few months ago... the mentorship that I've had from them over the last 15 years has been fantastic."

He hopes to be able to provide this same inspiration and mentorship for his own students and give to the programme which gave him so much. This clearly demonstrates the impact that EXSEL has on its students, giving them a boost into the world of cardiovascular research, and in turn giving back to future generations.

Finding the forgotten

Dr Penelope (Penny) Sucharitkul

EXSEL Project

Awarded an EXSEL scholarship in 2019, Penny's primary research interest around vascular conditions was established at the beginning of her research career. Whilst not all vascular conditions concern the heart, they do fall under the wider umbrella of cardiovascular disease and concern the blood vessels responsible for transporting blood around the body. Penny's first project focused on patients with peripheral arterial disease (PAD), a condition whereby fatty deposits in the blood vessels disrupt the blood flow to the legs. This can cause pain, and several related complications to do with the circulatory system and heart.

The project specifically explored the cardiovascular outcomes of patients with PAD who had had recent surgery. Within this field there is a concept known as the "obesity paradox", namely that patients with PAD who are overweight have better outcomes from surgery than those who are not overweight. Though there is awareness of this occurrence, it is poorly understood. Data was examined from 177 patients over a time span of three years, investigating whether there was a relationship between waist circumference and outcomes from peripheral artery bypass surgery (PABG). The results demonstrated that there was indeed a relationship between higher waist circumference and better survival four years post procedure. It was concluded that this could be an important factor in improving long term survival in these patients, and thus warranted further exploration.

For Penny this had been, in her own words, a "little student project where I was sitting at a computer collecting data" from which she was able to build an abstract and presentation. That "little student project", however, turned out to be an international success. Published in the journal of International Angiology and gaining Penny significant recognition at a number of vascular science conferences, it is something she remains known for within the world of vascular surgery until this day.

Subsequent Research

This project sparked an interest in PAD, something Penny was determined to develop. Following her EXSEL project, she took a year out of her medical studies to explore her research interest more deeply as part of a master's programme. From there, whilst finishing medical school, she continued to develop her research skills and knowledge, picking up more recognition in a number of major journals, a substantial achievement whilst still an undergraduate student. Her research has slowly evolved into focusing on medical optimisation in vascular surgery, namely ensuring that patients get the best possible outcomes from their procedure, with prioritisation on not just long-term survival but also quality of life.

What's next

Since graduating from medical school, Penny has entered onto the Academic Foundation Programme, a set up that allows junior doctors to dedicate a certain amount of time to their research alongside training to become a doctor in the NHS. From here she hopes to embark on an Academic Clinical Fellowship, which would allow her to continue her research whilst qualifying as a vascular surgeon.

Despite her success and international recognition, Penny's motivation remains simple; to prioritise patients that may be otherwise forgotten and to ensure that patients with PAD receive the utmost care. For this, research being led by patients is key, and Penny explains that her work is supported by those it exists to help:

"I send all my projects to PAD specialist groups that all look at all my research and go why are you not looking at this? We have pain in our legs. Why are you not focusing on this? They actually tell me what they want in their research and what will benefit them most."

The culture of patient- oriented medical research is a growing one across the international academic community. For Penny, its origin is much closer to home. Her father Richard is diabetic, and him raising her as a single father exposed her to the realities of the impact that a chronic illness can have on someone's life. It is this perspective she continues to embed within her work at every opportunity, stating:

"I like to think about the social aspects. I think about how my dad is taking his medications or how would somebody in this situation take that medication. I feel like it is something I have a bit more insight on."

What did EXSEL mean to you

Like many students, Penny admits that without the financial support of EXSEL she would have had to work every summer of medical school, leaving no time to engage in research. However, it isn't just the financial backing that stands out as a benefit of EXSEL, but the people. Coming to university with a non-academic or medical family background, Penny felt naïve to the realities of academia and research, with no real idea how to start or where to go for support. This is where, as Penny explains, EXSEL stepped in:

"EXSEL provided those people who were sort of almost like parental figures, to just encourage me... it encourages you to set a standard for yourself that's higher than you would have expected."

This support was unparalleled for Penny, even when she was daunted by some of their suggestions, as she recalls:

"When my first supervisor said: "you're going to go to that conference and you're going to speak in front of 200 people". I said, absolutely not. I'm not going. But then EXSEL told me I should be doing it and put that emphasis on me that I could reach that ceiling if I wanted it. And then I just went for it and realised that actually it's not as hard as it's made out to be"

EXSEL seeks to provide not just monetary support but also create networks of academics across generations to provide mentorship and support for all elements of research.

For all students in EXSEL, but especially those from less advantaged backgrounds like Penny, EXSEL is a game changer, exposing students to opportunities and funding that would otherwise be completely inaccessible.



"I really want to be that person that comes into vascular surgery and changes all these guidelines. I want the guidance to be up to date. I don't want these patients to be left behind and people to forget about vascular diseases."



Penny and her father Richard





Excellence in EdTech

Dr James Gupta

LURE Scholarship

As the son of a doctor, James has always had a career in medicine on his radar, though his journey within it has been less than conventional. Originally a philosophy and politics student, James ultimately decided that he wanted to follow in his father's footsteps and do medicine, getting into the University of Leeds via an access programme in Bradford. He was subsequently a 2013 recipient of a Leeds Undergraduate Research & Enterprise (LURE) award, the programme that was a precursor to the current EXSEL programme.

The project which James was assigned focused on blood vessels in insulin resistant patients. People with diabetes or other forms of insulin resistance are high risk for cardiovascular events, such as heart attacks or strokes. This project explored whether stem cells could be used to help repair damaged blood vessels in this group of patients, to help prevent potentially dangerous outcomes.

“If you give me something manual to do, I’ll spend twice as long trying to find a programme for it.”

“I was always trying to find a more computer-based way of doing things, so trying to make like an algorithm to stop them having to do things manually.”



However, despite his aptitude for his medical studies, James continued to harbour a strong attraction to his other major interest, namely computation.

“I was always trying to find a more computer-based way of doing things, so trying to make like an algorithm to stop them having to do things manually.”

Scholar to Synap CEO

Unlike the other EXSEL scholar alumni seen here, James ultimately made the decision to not to continue into a career in healthcare. Instead, he invested himself into a venture that he and a friend had started whilst still undergraduates at Leeds.

Originally conceptualised as a learning platform for medical students, the app allowed them to create custom question cards that could be used by other students. Now branded as Synap, they have branched out fully into the world of educational technology, colloquially known as EdTech. Synap comprises of an artificial intelligence-based system which is designed to aid learning and

promote effective recall of information. Additionally, they offer a platform on which educational institutions can deliver courses and exams.

Despite being a relatively young company within the tech industry, they now have a team of 15 (if you include their resident wellbeing terrier Ori), have clients including the University of Law and the Oxford University Press, and are only continuing to grow.

Though he chose not to continue into the medical field, James stands by the fact that his background still proves highly valuable, especially the skills he gained from his time in EXSEL, as he explains:

“EXSEL showed me a lot of skills at a higher level than you’d get on the undergraduate medical degree. I still use those skills to this day when we’re doing data analysis for clients.”

The role of tech in medicine

James’s work highlights the increasing role of the technology sector in both education and healthcare. In particular, the utilisation of artificial intelligence (AI) poses an interesting question in terms of its potential to aid the development of medicine and healthcare. From his perspective, James says AI has a place within medical practice:

“I definitely think that AI can bolster what clinicians are doing and I think, to an extent we’re already doing that. You’ve got treatment decision programmes which sift through data to decide what dose someone should be on.”

However, it is important that medicine does not lose its “human touch”. James clarifies that regardless of the proficiency of AI systems, they should always continue to be overseen by an actual trained professional. That said, the role of technology and AI within society will only increase, and healthcare is no exception, as James explains:

“There is an ageing population, you’re just not going to have enough clinicians to look at,

and look after, absolutely everything. In a sensible way, you can utilise AI to get more value out of doctor’s time.”

One of the major questions of the current day is the effect that AI will have on society. James and his colleagues at Synap are demonstrating the good that these systems can have for learning and the educational sector. Heart Research UK funds several projects that involve AI, particularly within the field of complex imaging. Though there are several valid concerns about the potential of AI, it is also clear that it may have the ability to advance medicine beyond our wildest dreams.

A passion for asking why

Dr James Manning

“I always find myself asking even about the little things we do in hospital. Why do we give this type of fluid? Why do we give this much? Why do people say this? I always think ‘Why?’. Where’s the evidence for that?”

EXSEL Scholarship

James’s introduction to EXSEL was not a formal one, rather something he had heard about in passing. Already quite interested in medical research, but faced with a curriculum at Leeds that had a strong clinical focus, James decided to reach out to a vascular surgeon to gain insight into the research aspect of medicine. On this basis, he applied to EXSEL and became a scholar in 2016.

While an undergraduate scholar, James embarked on a few research projects, primarily focusing on vascular pathology, namely conditions in which there is an issue with one or more blood vessels in the body. In particular, he focused on the repair of abdominal aortic aneurysms (AAA). An AAA is a swelling in the lower part of the aorta, the blood vessel that carries blood away from the heart. Whilst this can be symptomless, rupture of these aneurysms can be fatal and so repair is sometimes required.

James’s research specifically explored endovascular repair (EVAR) of AAA, which is a type of keyhole surgery, a less invasive alternative to open surgery. In particular, the work focused on using CT scans, and measurements of muscle mass, to establish individual risk for going through this procedure, to try and improve outcomes for patients.

A major benefit of the EXSEL programme is that it confers ongoing support for students to explore the full extent of their interest. From endovascular repair of aneurysms, James’s focus would pivot significantly.

LEAD Scholarship & Harvard

The LEAD scholarship is another programme at the University of Leeds that provides funding for undergraduates to do extra-curricular studies. Whilst not affiliated with Heart Research UK, a number of our EXSEL scholars have gone on to receive LEAD awards, including James. He explains how it allowed him to explore another interest, the world of psychiatry:

“One of the opportunities on the EXSEL scheme is the LEAD scholarship. You submit a project to be able to visit a recognised International Centre of Excellence. I was quite interested in psychiatry at the time, and so I reached out to the Psychiatric Neuroimaging Laboratory (PNL) at Harvard Medical School.”

During his time at PNL, James worked on a project looking at different methods of classifying mental illness, incorporating MRI scans. Getting the opportunity to use novel technologies and exposure to imaging methods served as a valuable learning experience.

Despite the additional financial backing of the LEAD award, James admits the drive to embark on such an endeavour was fuelled by his participation in EXSEL:

“EXSEL was great because it presented you with so many opportunities... I probably wouldn’t have done something like that had it not been for EXSEL.”



London North West University Healthcare NHS Trust

The road to haematology

Towards the end of his time at medical school, James found himself homing in on what would become his ultimate speciality, haematology, the study of blood and blood disorders. The first haematological studies he was involved in looked at a rare blood disorder in pregnancy and how the treatment affected outcomes for mothers and their infants. The research demonstrated that the treatment was safe during pregnancy and had no negative impacts on either mum or baby, gaining him a publication in the Journal of Obstetric Medicine.

After graduating from Leeds, James moved to London and embarked on the Academic Foundation Programme. Here, again, his research landed on haematology, this time focusing on a clotting disorder called anti-phospholipid syndrome in which people are prone to blood clots.

Future Ambitions

Whilst his interest in haematology stands firm, James’s exact plans for his future are still up in the air. Having recently completed his foundation medical training, he has just started on his speciality training in internal medicine at London North West University Healthcare NHS Trust. From here, he can then specialise further. When asked whether he will specialise in haematology at this point, James admits there are other things that interest him too, he explains:

“I’d like to do haematology, that’s one option. But then there is a relatively new specialty in medicine called obstetric medicine. It is addressing a gap whereby obstetricians are principally surgeons but there are lots of pregnant women with complicated medical conditions.”

Regardless of his chosen medical speciality, his primary motivation will remain the same, the drive to always ask ‘why’. Referring to a series of articles in the American Medical Association Journal called “Things we do for no reason”, James states that there are many things in medicine, much like other lines of work, that are done a certain way simply because that is always how they have been done. His ambition is to establish why things are done, if they can be supported, and if not, to change them to provide the best possible outcomes for patients.

This drive for asking ‘why’ was the catalyst that motivated James to apply for EXSEL where his love for asking questions was actively encouraged. This is not the only thing he has taken away from the programme however, as he says:

“You make long term friendships, and you form long term relationships... It was really special because you don’t have that kind of that close knit community feel when you’re in a massive university cohort with 200 people.”

The ability of EXSEL to encourage critical thinking and other academic skills, alongside fostering meaningful long-lasting relationships is what makes it such a special programme to its students. It enables students to develop not just as people, but as future doctors. In this case, it has produced a doctor who will never be afraid to ask ‘why’.



It takes two hands to save a life

Dr James Nicholson

An introduction to research

A 2017 EXSEL scholar, James entered medical school with a primary interest in clinical medicine, with little attraction to research. However, an encounter with an academic at Leeds introduced him to the EXSEL programme and the opportunities it had to offer. Describing himself as someone “who liked to ask questions”, James saw that EXSEL could provide him with the time and capacity to potentially find answers to these questions.

His first summer project, in collaboration with Professor Robert Ariens, focused on the microscopic structure of blood clots. In particular, the work explored the packing of molecules known as protofibrils and how this affects how the clot breaks down. When clots break down, they can travel and cause blockages in the blood vessels, causing heart attacks, strokes, and thromboses (such as deep vein thrombosis (DVT)). Despite this being a highly valuable introduction to lab research, James admits it didn’t fully reflect his ambitions:

“It gave me an understanding of translational research and I learned a lot about the topic, but I found it quite hard, and the work felt distant from the potential clinical impact.”

Resuscitation medicine

James, instead, turned his attention to more clinical research focuses, namely research that would more directly impact patient care. James decided to combine an existing interest in emergency medicine with a newfound enjoyment of research and enter the world of resuscitation research. Here, James found his passion for education with specific focus on teaching people how to effectively perform CPR in the community. This is a pressing issue across the UK, with 30,000 out-of-hospital cardiac arrests in the UK each year. The survival rate is currently less than 1 in 10, but effectively performed CPR can double the chance of survival.

While still an undergraduate, James established the Leeds Student Community First Responders programme, which trains students to give CPR alongside other emergency first aid skills. These volunteers work with the Yorkshire Ambulance Service to provide the initial response to 999 emergencies across Leeds. Describing this work as one of the highlights of his career, James states the simple reason why the programme means so much to him:

“When someone has a medical emergency in the community, the initial responses are led by bystanders and not medical staff and so I’ve focused on the practicalities of getting untrained people to do the right thing.”

“One of the stepping stone of my career was launching the first responder scheme in Leeds, which is now still going six to seven years later, and I’m not involved at all - and that’s just amazing when you get to see that.”

If leaving a lasting legacy at Leeds wasn’t sufficient, this work led to a partnership with Resuscitation Council UK, whereby James was involved in the delivery of their Restart a Heart initiative across 20 medical schools in the UK.

Further research

Having graduated from medical school in 2021, James completed the Academic Foundation programme, allowing him to complete his junior doctor training whilst also continuing his research at the University of Edinburgh. One of his most recent projects centred around public access defibrillators and how 999 call handler scripts affect bystander CPR efficacy. He explains:

“Currently if you call 999 for a cardiac arrest, they will direct you to retrieve and use the nearest defibrillator using a very specific script. We used simulations to identify the typical errors that bystanders could make following those instructions, for example by misinterpreting a key command. This will allow us to refine the script to help bystanders do the right thing every time.

Bystanders are sent to nearest defibrillator ‘as the crow flies’. We did a mapping-based analysis exploring what happens if we send you on a walking route to the nearest defibrillator instead. We found in the City of Edinburgh that in one third of cases you should be sent to a closer defibrillator to where you’d currently be sent.”

James recently presented his work at the Scottish Cardiac Arrest Symposium and the team hopes to submit it for publication in the coming months.

Medical education

Whilst James’s research and practice as a medical doctor consume a significant amount of his time, they are not his only passions. One of his main interests harks back to his days as an undergraduate, and his aptitude for teaching others. He explains to me how he plans to integrate this into his future career:

“I’m taking a bit of a segway into education. I want to develop a career where I spend a large chunk of my time doing education and research... My plan is to try and train in emergency medicine or intensive care medicine, but then I would like to have a career where I’m spending 30 to 40% of my time doing research around emergency care and undergraduate education.”

James has recently accepted a job at NHS Highland as a Clinical Teaching Fellow, whereby he is involved in the teaching of undergraduates at both Aberdeen and Dundee medical schools. This is an achievement he credits to his experience as an EXSEL scholar, as he states:

“EXSEL led me into the Academic Foundation Programme where I developed my work on the resuscitation side of things and I’m now onto a medical education trajectory. I think the EXSEL programme, and the Academic Foundation work, really got me the job.”

Medical education is the mechanism by which medicine can continue to evolve and keep up to date with the most cutting-edge methods and treatments. James hopes that through resuscitation research and more education, both amongst the medical and general community, more people will be able to effectively perform CPR and learn how to save a life.

EXSEL through the generations

As was the initial aim of EXSEL, James found it granted him both the time and financial freedom to explore opportunities he otherwise would have been unable to take. However, when asked, that was not the main element of EXSEL that stood out to him, instead he says:

“It’s about community. There was a very strong identity amongst the four scholars in the cohort, and so there was this community of students within the EXSEL group across different year groups. I took a huge amount from people a couple of years ahead of me who were already progressing in the field I was interested in when I couldn’t see anyone else around me who was interested in that”

This highlights that EXSEL creates not just networks between undergraduates and academics, but powerful community between generations of ambitious, talented medical students. This peer-to-peer support and encouragement is a standout feature of EXSEL that will only get stronger as the programme continues.



EXSEL in 2024

Approaching 20 years since its inception, the EXSEL programme continues to be transformative for its students. The next four scholars are part of the current EXSEL cohort, discussing their research projects and where they hope to go next.





Aspirations across the pond

Many medical students fulfil a childhood dream by going to medical school, however that was not the case for Wiktoria. Instead, she discovered the possibilities of working within healthcare as a teenager, as she elaborates:

“My first language is Polish, and I worked in Alder Hey in Liverpool as a medical interpreter for two years. I never really wanted to go into medicine but when I was in the hospital, I realised how much you can change someone’s life in a really short period of time.”

This experience prompted her to go to university for Medicine, and during a first-year presentation she learnt about the EXSEL programme and successfully applied. Her first project involved using a high-powered microscope to examine cardiac cells in patients with diabetes to explore how certain antibodies may contribute to heart failure. This enabled her to develop lab skills and knowledge that would not have been otherwise attainable from the standard medical curriculum.

From there, Wiktoria applied to the LEAD award, and embarked on an exciting opportunity across the pond. Over the summer of 2023, she spent nine weeks at Columbia University in New York City. Here she was involved in a project that used robotic and VR technology to aid physical therapy for children with cerebral palsy.

Currently in her fourth year of medical school, Wiktoria is on placement as a student doctor in the NHS, which allows her to explore multiple fields, including paediatrics, obstetrics and gynaecology and palliative care. Her long-term goals are still very much up for debate she says:

“At one stage I really liked the idea of going into academic surgery...One thing I’m sure about is that I want to do the academic route, so I know I want to do my foundation programme and I probably see myself doing a PhD in the future.”



Optimising surgeries of the future

Introduced to the EXSEL programme in the first year of her studies, Precious’s original EXSEL project was focused on the composition of blood clots. Specifically, she studied their role in strokes and how patients may recover depending on the different structures of the clot. However, cardiology is not the only area that has captured her interest. Taking a year out of her medical studies to complete a Master of Research (MRes), Precious turned her focus to colorectal cancer, a project for which she was awarded the prestigious Endeavour medal from the University of Leeds.

Her main interest, however, is surgery, with projects examining medical student perceptions towards surgical careers and surgical optimisation. For the latter, Precious travelled to Stanford University for a summer project looking at surgical technique optimisation. She explains why this is beneficial to future generations of surgeons:

“You have different surgeons who think their way of doing surgery is the best way. We were trying to see what makes someone efficient and how they’re doing it. In that way you can optimize the teaching that you can give to trainee surgeons.”

It is within this field of study that Precious’s ultimate dream lies. She aspires to become an academic surgeon, a route that would allow her to pursue her academic interests whilst still being a practicing surgeon. Whilst a daunting prospect to some, Precious explains how the EXSEL programme has altered her perceptions of what might be possible in her career:

“The people make you believe that what you dream about research is not impossible because there are people who have done it. I think it’s very important because it allows you to dream a bit bigger.”

For these dreams to be in reach, Precious must first complete her core medical training and intends to apply to the Specialised Foundation Programmer to maintain her research interests.



From pandemics to practice

Having completed an undergraduate degree at the University of Edinburgh in medical sciences, Nishan decided to pursue medicine at Leeds. This decision was, in part, driven by the EXSEL programme, he explains:

“I heard about EXSEL before I even applied to Leeds... I saw that they offer the opportunity to people that want to do research and to nurture those interests. I thought it sounded perfect.”

Despite successfully fulfilling his goal of being accepted to the EXSEL programme, there was now a different challenge to be faced, namely the impact of the COVID-19 pandemic in 2020. With the majorities of labs closed, and many research projects grinding to a halt, the Directors of EXSEL had to get creative. Nishan embarked on a remote project looking at blood pressure alarm limits on the monitors used when a patient is under anaesthesia. Whilst not a topic that he may have chosen under different circumstances, the resulting published abstract and poster made it a thoroughly worthwhile project.

Though his initial EXSEL project came with its disruptions, Nishan admits that it had sparked a passion for research, and he pivoted interests to the field of tissue engineering. In particular, he has been involved in a project developing regenerative heart valves which are made from animal tissue but then can be replenished by human cells to form a functioning valve.

Now in his final year of medical school, Nishan must make the decision of what he wants to do next, something he says is not the easiest of calls to make:

“I’m still figuring it out. I’m interested in paediatrics. I like neurology. I like general practice. So, I’m not sure, but whatever it is, it’s got to be something which allows me to carry on doing some academic work.”

Nishan intends, like many of the EXSEL scholars before him, to apply to the Academic Foundation Programme, now known as the Specialised Foundation Programme, which will allow him to continue academic pursuits alongside his core medical training.

“I heard about EXSEL before I even applied to Leeds... I saw that they offer the opportunity to people that want to do research and to nurture those interests. I thought it sounded perfect.”



A variety of passions

As a young child, Sumayyah experienced the loss of a family member to Parkinson’s disease, and she was exposed to both the world of healthcare, inspiring her to go into medicine, but also to the potential of medical research, as she recalls:

“Going back many years, research for Parkinson’s was in its early stages... Now I read about the developments made in Parkinson’s and how far they’ve come in the recent 10 to 15 years, and I’m truly fascinated. The impact these elements of research and drug discoveries have is so large and has a very profound effect on the lives of patients and their families.”

Sumayyah’s original EXSEL project was done under the supervision of Dr Peter Swoboda, a Heart Research UK Medical Panel member and grant holder. The project looked at the use of the drug, Herceptin, a common drug in breast cancer. This drug can have cardiotoxic effects, and this project used AI technology to monitor the heart function in patients. The project was ultimately accepted by the Society of Cardiovascular Magnetic Resonance, and Sumayyah travelled to San Diego to present at their yearly conference.

Like many other EXSEL alumni, Sumayyah made the decision to intercalate and take a year out of her studies to pursue a research interest in neurosurgery. Despite coming into medical school with a primary interest in neurology, she admits that cardiology has captured her attention, but says that it is still too early to decide her long-term ambition just yet.

Currently working on projects with multiple sclerosis (MS) and glioblastoma patients, the EXSEL programme has clearly encouraged Sumayyah to engage in ongoing research. Alongside the opportunity for research experience, she explains the biggest benefit of EXSEL has been:

“I think the sense of community, mentorship and company of like-minded individuals is so valuable. It is a space where you all have a common trajectory, but still have the flexibility to be creative and explore new projects you’re interested in.”

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Heart Research UK wishes Nishan, Precious, Wiktor and Sumayyah the best of luck with their future careers.

The future of EXSEL

It is evident that the EXSEL programme is not confined to just the opportunity for a summer research project. Spanning both many fields of research and multiple generations, EXSEL has succeeded in creating a network of supportive, ambitious individuals, in which excellence can truly thrive.

Crucially, it grants access to opportunities many students would not otherwise have access to, allowing for the development of key research skills alongside core medical training. It is testament to EXSEL's influence that so many of its alumni have chosen to go into the Academic Foundation Programme within the NHS, which will allow them to continue to grow their research knowledge and prowess whilst also training as clinicians.

EXSEL is paving the way for a generation of doctors, researchers and entrepreneurs who will continue to champion the very best of medicine. Whether this be in cardiology, education, or another medical field, EXSEL is creating the space from bench to bedside, and everything in between.



EXSEL would not have such significant impact on its scholars were it not for the commitment and continued investment of the University of Leeds. In collaboration with Heart Research UK, this institution is blazing a path in championing the medical researchers of the future and shaping the landscape of cardiovascular care for generations to come.

“As an impact focused institution, the University of Leeds is influential on a world stage. By training the next generation of problem solvers and global citizens in a research-intensive environment we have the power to tackle global issues at scale. The EXSEL programme supports this aim, providing medical students with the time and funding to explore a research project alongside their studies, developing skills and connections globally to progress into leadership positions within the NHS, academia, and biomedical research organisations.

It is a privilege to work with the EXSEL scholar community and hear the variety of experiences and opportunities our students have had during their time on the programme. From supporting medical professionals in hospitals in Madagascar to joining world leading research teams in the US, the breadth of success is truly global.”

Alex Lakin, Development Manager,
University Leeds



Heart Research UK has committed to funding at least three more years of EXSEL scholars. It represents a key cornerstone of Heart Research UK's activities, namely, to support the development of new researchers within cardiovascular medicine. We are truly grateful for the way we are represented by our EXSEL scholars, as they progress through their wonderful careers, embodying our commitment to a world without heart diseases.

Heart Research UK believes that education is paramount, and our extensive education programme includes surgical fellowships and masterclasses to ensure the very best care for those with heart diseases.

We will be here until there are no more deaths from heart diseases.

Acknowledgements

This work would not have been possible without the contributions of the following:

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To our scholars,

It has been my privilege to speak to you all over the course of this project. Your passion and ambition shines through in everything you do. From being surgeons, to academics to tech entrepreneurs, you are inspiring the generations of EXSEL to come.

At Heart Research UK, we are so incredibly proud of each and every one of you and cannot wait to see where your incredible careers will take you.

To our supporters,

Your kindness and generosity enable programmes like EXSEL to not only exist, but to continue for generations to come.

You are shaping the future of heart disease research, and for that, we are so grateful.

Thank you.



**Until there are no more deaths
from heart diseases**

heartresearch.org.uk/research