St Mark's Hospital's Surgical Robotics Research Programme

ST MARK'S HOSPITAL FOUNDATION

Leading the way in Robotic Colorectal Surgery

St Mark’s expertise in colorectal and intestinal medicine has been amassed over nearly 200 years. Being at the forefront of bowel disease research and clinical care enables the hospital to improve patients’ survival and health-related quality of life. The introduction of robotics to the hospital’s surgical practice in 2018 represents another major milestone; St Mark’s is now leading the way in robotic colorectal surgery.

Contents

St Mark's: A history of discoveries and innovations

For almost two centuries, St Mark's has been dedicated to the treatment and management of patients with complex bowel diseases, attracting a critical mass of leading clinicians and researchers across the spectrum of gastrointestinal disease.

This focus and expertise has provided fertile ground for making discoveries, revealing new insights, establishing best practice, and developing surgical and endoscopic innovations that are improving patients' survival and health-related quality of life. The introduction of robotics to the hospital's surgical practice in 2018 represents another major milestone.

The journey from open to keyhole to robotic surgery

While some surgeries are still better suited to an open operative technique, increasingly, more surgical procedures can be performed in a minimally invasive way.

Laparoscopic or 'keyhole' surgery came to the fore in the 1990s. At that time, St Mark's assessed its open operation outcome data and compared it to the early data for keyhole surgery. This comparison revealed what could be achieved for patients by changing the operative approach to a minimally invasive technique, and highlighted that, while St Mark's had amassed experience in performing open surgery since its founding in 1835, the skills gap in laparoscopic surgery needed to be addressed.

This led to the appointment of Professor Robin Kennedy as a St Mark's Consultant in 2006. Professor Kennedy was a pioneer in laparoscopic colorectal surgery and the development of the Enhanced Recovery Programme, as well as the creator of the National Training Programme for colorectal surgeons, known as LAPCO. In the years following Professor Kennedy's appointment, more than 90% of operations performed at St Mark's were being undertaken with a keyhole approach.

Having been late to adopt keyhole surgery, St Mark's was determined that the opportunity to research and implement robotics for colorectal and anorectal surgery would not be missed.

Professor Robin Kennedy (right) observing a colleague performing keyhole surgery for bowel cancer

Robotics at St Mark's

Robotics were first implemented and established for other surgical specialities, specifically urology and gynaecology, and had not been widely researched and implemented for colorectal and anorectal surgery.

Mr Danilo Miskovic was appointed as a St Mark's Consultant in 2017 and was tasked to lead the programme as an experienced robotic surgeon. He joined St Mark's from Leeds Teaching Hospitals where he had an established robotic surgery practice. St Mark's Hospital Foundation subsequently launched a capital campaign to raise the first set of funds needed to bring the most advanced surgical robotics platform to St Mark's. Support from our donors at this time was critical and enabled us to take delivery of a da Vinci surgical robot in 2018 from the industry leader, Intuitive Surgical Inc.

Once an infrastructure to support the robotics programme had been established, which included training a multi-disciplinary team of theatre staff, it was not long before the first robotic colorectal operation was performed.

Mr Danilo Miskovic operating using the da Vinci surgical robot

April 10th 2018, a milestone moment as the first robotic colorectal operation takes place at St Mark's

Surgical Robotics Research Programme

Objectives

St Mark's Surgical Robotics Research Programme has been designed around three objectives and this document describes our activities and achievements against each one.

- **Research:** To actively participate in research concerning the potential benefits of robotic surgery for patients with colorectal disease.
- **Clinical:** To introduce robotic surgery safely into our daily clinical practice and offer it to all our patients with colorectal disease.
- **Educational:** To become a national and international training hub in robotic colorectal surgery.

Activities & Achievements

RESEARCH

Trial participation

Since 2018, we have been invited to participate in trials of national and international importance, one of which is assessing the potential benefits of robotic surgery in rectal cancer.

PhD students

At any one time, St Mark's has as many as 30 Research Fellows working on projects covering all aspects of gastrointestinal disease; the robotics programme specifically has had a series of doctors undertaking PhDs in robotics and cancer surgery. Examples include:

Miss Nicola Hodges

'DRIVEN: Personalising surgical treatment and strategy for patients with right colon cancer'

Currently, patients with right-sided bowel cancer are grouped into 'good' and 'poor' prognostic groups after they have undergone surgery and the surgical specimen has been assessed. It is not possible to risk stratify patients based on their survival outcome pre-operatively, which means there is no opportunity to change the operative approach based on prognosis, and no reliable means to identify patients who may benefit from chemotherapy before, rather than after, surgery.

This project aimed to develop and validate a pre-operative risk stratification method for patients with right-sided bowel cancer to improve survival outcomes. It was a collaboration between St Mark's and radiology and pathology colleagues at Imperial College, The Royal Marsden Hospital, and the Institute of Cancer Research.

More than 400 patients were identified, and samples taken from the tissue of over 75 patients. The tissue provided insights into how the immune system behaved in these patients. The preliminary results are encouraging regarding a novel method to stage right colon cancer and identifying patients who may benefit from more extensive surgery. These results are planned to be published.

Mr Jordan Fletcher

‘3D modelling in advanced colorectal cancer surgery’

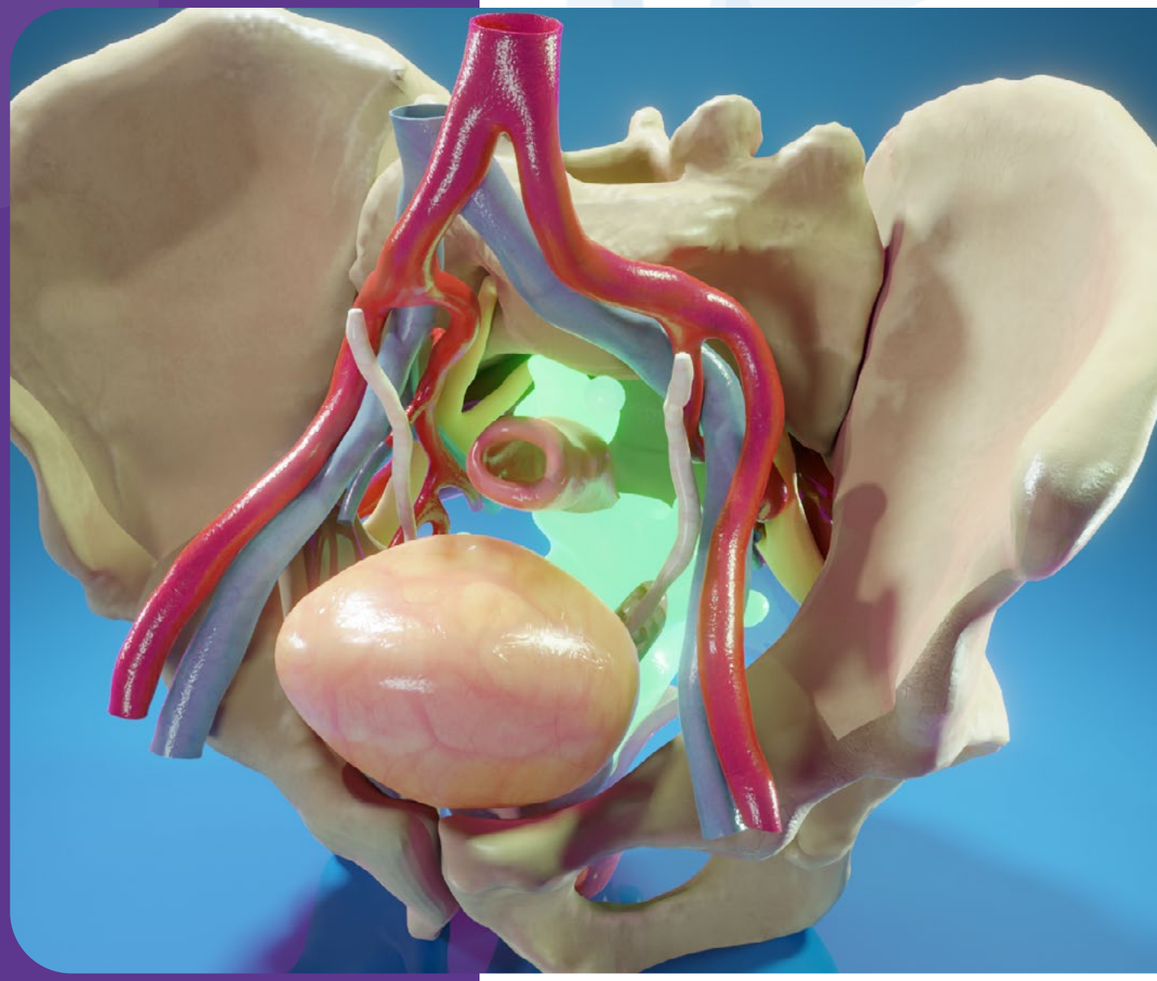
Our research group has focused on developing and evaluating 3D modelling technology in advanced colorectal cancer care.

Key projects include:

- Created automated techniques to efficiently analyse scans and build 3D models, overcoming barriers limiting broader use.
- Demonstrated how 3D models improve the anatomical understanding of the blood vessels that supply the colon. This may help surgeons perform cancer operations to remove the colon more safely.
- Showed the feasibility of surgeons utilising patient-specific 3D models to plan colon cancer surgery. We have 3D reconstructed 89 patient scans from multiple UK and European sites.
- Evaluated personalised 3D models as a patient decision-making tool for patients undergoing pelvic exenteration surgery for advanced rectal cancer. We recruited 60 patients to this study and found that models improved patient understanding. Patients reported that the models improved their experience, communication, and trust in the surgical team and provided emotional reassurance.

Our group aims to establish personalised 3D modelling as a widely adopted visualisation approach in colorectal cancer protocols. Integrating this technology has significant promise for empowering patients in treatment decisions and enabling precise surgery planning for optimal outcomes.

We continue advancing computational solutions to automate and streamline 3D modelling techniques for seamless clinical translation. Through further research, we hope to spearhead efforts cementing personalised 3D modelling as an integral pillar of patient-centred cancer care worldwide.



The research group develops methods to convert patient CT/MRI scans into detailed virtual models of organs and tumours; 3D image produced by Mr Jordan Fletcher

Miss Georgette Camilleri

‘The prognostic value of lymph nodes in colon cancer’

This research is part of the wider DRIVEN project, described on page 7. Research has shown that enlarged lymph nodes located near a colon cancer reflect the patient’s immune system, which is actively fighting the cancer. It is known that patients with a small number of lymph nodes face a higher likelihood of cancer spread or recurrence, while those with a large number of lymph nodes tend to have better outcomes.

Currently, the number of lymph nodes is only known at a later stage of treatment, once tissue is analysed after surgery. This research is looking into lymph node quantity and size on the pre-surgery scans as predictors of patient outcomes. This will help us decide which patients require early chemotherapy and aggressive surgical interventions, currently performed at St Mark’s with the robotic platform, and which patients can be spared these harsh treatments.

Counting and measuring the size of lymph nodes manually for each patient with colon cancer is very time-consuming and repetitive work. To navigate this challenge, it is planned to train a machine to perform this laborious task, thereby allowing doctors to allocate more time and attention to other critical aspects of patient care.

Miss Shaza Mohamed

‘Robotic surgery in complex colorectal cancer (ROBO COMP)’

This project sought to investigate the barriers to using a robotics platform for complex colorectal cancer surgery. Phase 1 involved interviewing 22 UK surgeons, both experienced robotic surgeons and experienced complex cancer surgeons. Phase 2 developed from the earlier work with the themes identified from the semi-structured interviews informing an iterative online questionnaire.

The barriers were: general (e.g. lack of access to and funding for robotic technology); training (lack of proctors and inclusion of robotic training in the surgical curriculum), and the lack of technicality of the robot which may, for example, impact on the ability to control blood loss. This part of the work involved 42 surgeons from 15 European countries. The research proposed specific solutions to each of the barriers identified.

Activities & Achievements

RESEARCH

Academic output

Our contributions to the emerging evidence on the effectiveness of robotics can be measured by academic output, specifically our progress in adding clinical evidence to the UK-wide registry, and the publication of papers and book chapters related to robotic surgery in high-impact, peer-reviewed journals. They include:

- Complete mesocolic excision versus standard resection for colon cancer: A systematic review and meta-analysis of perioperative safety and an evaluation of the use of a robotic approach.
- An early experience in robotic ileoanal pouch surgery with robotic intracorporeal single-stapled anastomosis (RiSSA) at a tertiary referral centre.
- Robotic proctocolectomy and ileoanal pouch with robotic intracorporeal single-stapled anastomosis for familial adenomatous polyposis - a video vignette.
- Textbook oncological outcomes for robotic colorectal cancer resections: An observational study of five robotic colorectal units.
- The current status of robotic colorectal surgery training programmes.
- Short-term clinical outcomes of a European training programme for robotic colorectal surgery.
- Augmented reality: moving robotics forward.
- Robotic right complete mesocolectomy with patient-specific three-dimensional modelling for planning and intra-operative navigation - a video vignette.

Activities & Achievements

CLINICAL

Procedures performed 2018-2023

>600

Locations: St Mark's Hospital at Northwick Park and St Mark's Hospital at Central Middlesex*

Robotic operations

When the surgical robot was based at the Northwick Park Hospital site, it was also used by surgical colleagues from the wider hospital's urology, gynaecology, and maxillofacial departments, contributing to its overall utilisation. The relocation of the robot to the new hub of St Mark's at Central Middlesex has strengthened the colorectal programme and the robot is being used by the colorectal surgical team every day; unlike in other hospital trusts, the focus of our robotics programme continues to be colorectal surgery.

*The surgical robot was relocated to the Central Middlesex Hospital site, the new hub of St Mark's, when other clinical services were also moved during the Covid-19 pandemic in 2020. This has greatly supported planned robotic surgical activity.

What our data is showing

At St Mark's, more than half of the bowel procedures eligible for robotic surgery are performed robotically. This compares to the national average which is less than 10%, and the US where it is 35%.

Furthermore, these are the textbook outcomes of the St Mark's robotic data next to the NHS England data for comparison purposes. A textbook outcome is a composite marker of quality that captures the most desirable surgical outcomes.

	St Mark's Robotics	NHS NBOCA(1)
No conversion to laparoscopic or open surgery	98.1%	92.0%
No mortality	99.1%	98.4%
No major complication (2)	92.6%	92.4%
No excessive LOS (3)	82.4%	80.0%
No readmission	94.4%	88.7%
R0 (4)	99.1%	92.6%
Textbook Outcome (5)	76.7%	51.50%

(1) National Bowel Cancer Audit Data from NHS England
(2) Complication requiring return to theatre
(3) Length of stay >14 days post-op
(4) Resection margins free of cancer
(5) No failure in any of the above

This table shows that our robot operation data for the measures used to assess operation performance is extremely positive.

Mr Kapil Sahnan:

CONSULTANT COLORECTAL SURGEON & CO-LEAD ST MARK'S ROBOTIC IBD PROGRAMME

About me

I am a Colorectal Surgeon with a passion for improving the lives of people with Inflammatory Bowel Disease (IBD) by leveraging my expertise in robotic surgery and research. My journey reflects my commitment to innovation. I completed my PhD at St Mark's in 2018 and my research focused on improving our understanding of fistula disease in patients with IBD. This academic foundation fuelled my pursuit of further expertise, leading me to Barcelona in 2022 for a specialised robotic fellowship. Today, I bring this unique blend of research and surgical experience to my practice, offering patients access to cutting-edge robotic surgery for IBD.

Robotics at St Mark's

At St Mark's, we are committed to developing and improving our robotic-assisted surgery while undertaking a rigorous research agenda. Our surgeons aim to perform the right operation at the right time using the right surgical approach. Robotic surgery utilises a sophisticated robotic system that translates the surgeon's hand movements into precise movements of miniature instruments within the body. This allows for exceptional dexterity and control, especially during complex procedures in delicate areas.

Robotic surgery translates to several potential advantages:

- **Minimally invasive:** robotic surgery involves smaller incisions, leading to less pain, faster recovery, and reduced risk of infection compared to traditional open surgery.
- **Enhanced precision:** the robotic system's magnified 3D visualisation and tremor filtration enable one to operate with remarkable accuracy, minimising tissue damage and optimising outcomes. It also facilitates surgical joins made inside the abdomen which may help the bowel recover faster.
- **Improved cosmesis:** smaller incisions also result in less visible scarring, a significant benefit for many patients, especially considering that some patients with IBD often require more than one operation during their lives.

Robotics & the future

I believe we can look forward to an exciting future. The advances will include:

- **Telepresence**, whereby surgeons from around the world connect, view, and discuss an operation as it happens, greatly democratising teaching around the world.
- The introduction of **artificial intelligence** to enhance surgical decision-making, reduce errors and potentially automate parts of the procedure.
- **Haptic feedback**, which will allow the operator at the end of the robotic console to feel the tissues being operated on.

Robin Munro
Patient Case Study

Operation: A Robotic redo ileocaecal resection and Kono-S anastomosis for Crohn's disease

Operating surgeon: Mr Kapil Sahnan

Operation date: 2023

"I have been under the care of St Mark's since 2019 following referral for treatment for IBD. I was initially treated medically but was then referred to the surgical team following complications caused by strictures in 2022.

In 2023, I met with St Mark's surgeon, Mr Kapil Sahnan, to discuss options for a potential repeat resection and was informed that my operation could be performed robotically. I had heard of the da Vinci Xi system, which is the model of the robotics platform at St Mark's, and knew that it was an advanced tool that supports the surgeon, with interactive arms that serve as extensions of the surgeon's hands.

Aware of the advantages of robotic surgery, such as more precise and smaller incisions, I understood how my recovery could be supported by this minimally invasive operative technique. Since my operation, I have been able to incrementally return to normal physical activities, beginning with short walks, followed by jogs, a Parkrun, and a half marathon at three months post-surgery. I no longer experience discomfort at the anastomosis (operation join), which was the problem that occurred many times a year prior to the surgery.

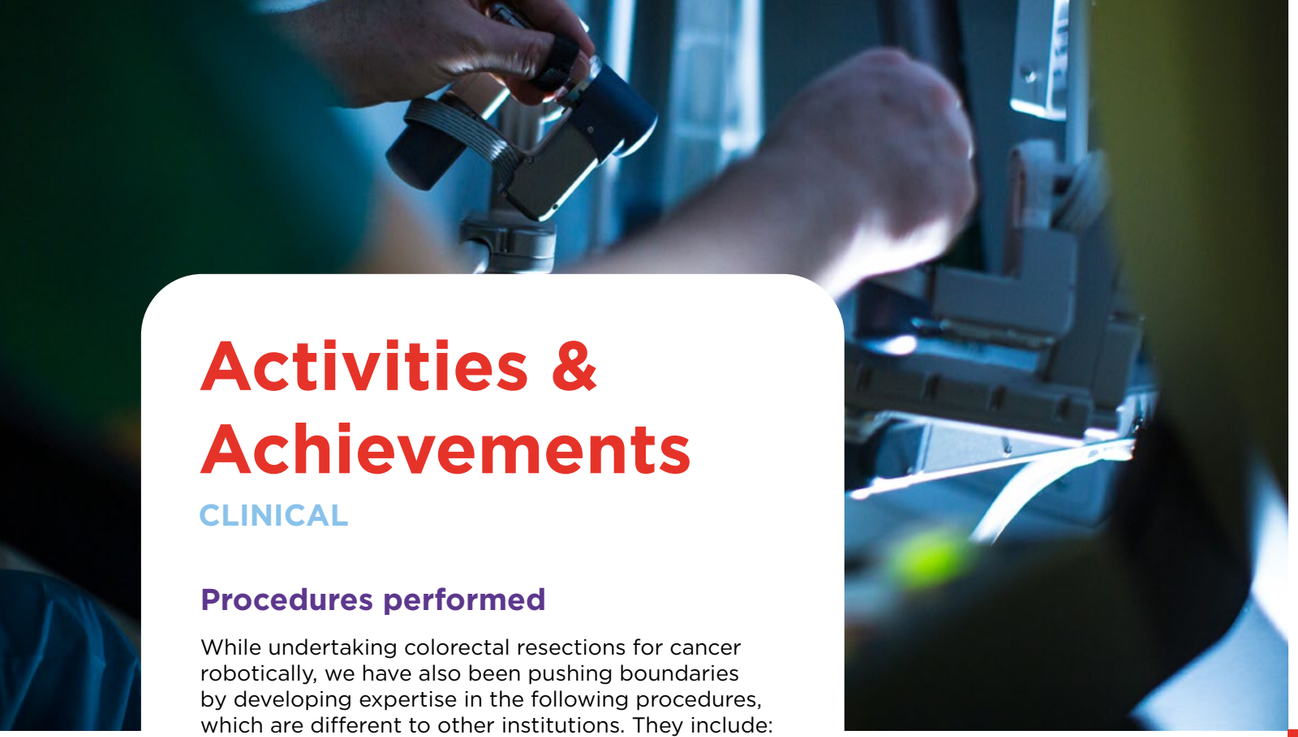
My surgery was preventative but necessary to avoid serious future complications. I know that teams of specialists contributed their expertise to my case, which reflects the multi-disciplinary team working at St Mark's, and I was glad to have the surgery performed robotically given the difficulty of some of the adhesions between the bowel and unpicking key areas, for example, around nerves. I expect this may have been more difficult with handheld tools and may have necessitated a larger cut to the abdomen."

Robin completing the 2023 Ealing Half Marathon three months post-surgery

"With the robotic system, we undertook an extensive adhesiolysis (removal of scar tissue caused by Mr Munro's previous open surgery) and could perform a thorough assessment of the bowel which allowed for an accurate determination of where to make his anastomosis (join). While laparoscopic approaches would have also been feasible, robotic platforms offer technical advantages, including an immersive 3D camera platform with high-definition view and multi-articulating instruments"

Mr Kapil Sahnan

Consultant Colorectal Surgeon & Co-Lead St Mark's Robotic IBD Programme



Activities & Achievements

CLINICAL

Procedures performed

While undertaking colorectal resections for cancer robotically, we have also been pushing boundaries by developing expertise in the following procedures, which are different to other institutions. They include:

Synchronous liver-bowel resections*

Pelvic exenterations**

IBD surgery

Robotic ileoanal pouch surgery***

Abdominal wall surgery

**these have been performed in collaboration with surgical colleagues from Hammersmith Hospital, London.*

***this is major complex cancer surgery which involves the removal of pelvic organs.*

**** Mr Miskovic and St Mark's Medical Co-Director and Consultant Colorectal Surgeon, Professor Omar Faiz, have collaborated on the development of robotic pouch surgery. Their colleagues before them, including surgeons Professor Robin Kennedy, Mr Ian Jenkins, and Mr Janindra Warusavitarne, developed approaches that have been important stepping stones towards the current concept. The robotic pouch work has been developed into publications (see page 11) and is an example of how we are disseminating new knowledge.*

Activities & Achievements

EDUCATION

Surgeons trained

At the time of writing, eight St Mark's colorectal surgeons have been trained in robotic surgery and a training schedule is in development for others who also want to develop their robotic surgical practice. As mentioned, the surgical robot is used every day, ensuring that it operates cost-effectively while still supporting a training programme.

Mr Danilo Miskovic

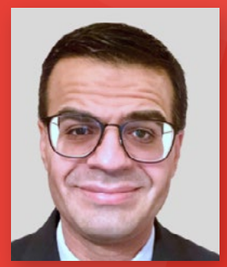
Mr Anthony Antoniou

Miss Elaine Burns

Professor Omar Faiz

Mr Kapil Sahnan

Mr Greg Thomas



Mr Akash Mehta

Miss Nicola Hodges

Activities & Achievements

EDUCATION

Robotics fellowships – an overview

Highly competitive robotics fellowships have been awarded to nine surgeons to date; each has spent six months under the mentorship of Mr Miskovic.

2019

Mr James Read
April 2019 to September 2019

Mr Hugh Mackenzie
October 2019 to March 2020

2020

Miss Corina Behrenbruch
October 2020 to March 2021

2021

Mr Malcolm West
April 2021 to September 2021

Mr Sofoklis Panteleimonitis
October 2021 to March 2022

2022

Mr Samuel Adegbola
April 2022 to September 2022

Mr Daniel Clerc
October 2022 to March 2023

2023

Miss Victoria Proctor
April 2023 to September 2023

Miss Ann-Marie Howell
October 2023 to March 2024

Activities & Achievements

EDUCATION

Robotics fellowships

Here, our first two robotics fellows reflect on their experience of the fellowship.

“Given the intensity of the operative experience and the quality of the mentoring, I was able to complete more than 30 console resections as the primary surgeon”

Mr James Read,

The first recipient of the St Mark’s Robotics Fellowship

Mr Read (left) and Mr Miskovic (right) operating robotically using dual consoles

Mr James Read
April to September 2019

“After an international application/interview process, it was my privilege and honour to be offered the first six-month robotic colorectal fellowship at St Mark’s Hospital.

Mr Miskovic is an international expert in both robotic colorectal resection and complete mesocolic excision which are at the forefront of innovation in colorectal surgery. Training in both techniques would otherwise have been impossible for me to obtain in the UK before taking up a consultancy post.

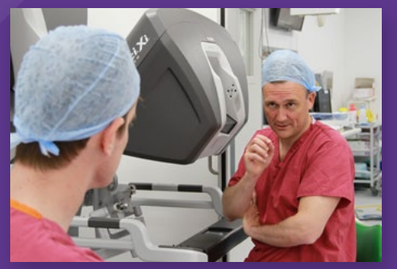
St Mark’s Hospital has the newest iteration of the da Vinci system and also dual consoles which greatly enhance the ability to provide world class training. Given the intensity of the operative experience and the quality of the mentoring, I was able to complete more than 30 console resections as the primary surgeon, having previously assisted on 20 more.

More often than not, training sessions were observed by a number of visiting surgeons who were able to watch the high-definition images on a flat screen display. This provided collegiate discussion and debate.

During my placement I was offered a locum consultant contract at the Royal Surrey County Hospital which is acquiring the infrastructure to make colorectal robotic surgery a future possibility.

I am extremely grateful to all the donors that have contributed to the Surgical Robotics Research Programme at St Mark’s Hospital, which has provided me with the opportunity to train in robotics under the mentorship of Mr Miskovic. I will constantly draw on this experience to benefit my patients over the next 30 years of my consultant career.”

Mr Read is now a Consultant General and Colorectal Surgeon in Guildford practising laparoscopic and robotic approaches with a special interest in technical innovation.



Mr Miskovic mentoring Mr Read

Mr Read checking the patient during a robotic operation

Mr Hugh Mackenzie
October 2019 to March 2020

“During my registrar training in the Wessex deanery, I focused on minimally invasive colorectal cancer surgery. The da Vinci robotic system provides an exciting new technique, allowing greater surgical accuracy, while maintaining the recovery benefits of keyhole surgery. It is increasingly becoming the ‘gold standard’ technique for colorectal cancer surgery.

Having undertaken a PhD based on training in laparoscopic colorectal surgery to gain competency in robotics, I was very keen to undergo formal mentored training. St Mark’s is a world-famous colorectal hospital with a high volume of colorectal cancer and has recently acquired the most advanced da Vinci robotic platform, making it the perfect setting for a fellowship. Having undergone a highly competitive application and interview process, I was delighted to accept a six-month fellowship.

The fellowship was supervised by Mr Miskovic, an internationally renowned robotic colorectal mentor and has followed a safe and structured training pathway. The first step was to gain familiarity with the robotic controls and set-up by utilising the in-built simulator and bedside assistance. This was followed by stepwise, mentored intra-operative training, progressing from the easier to more complex steps of colorectal resections.

The donors to the Surgical Robotics Research Programme made this fellowship possible and I am incredibly appreciative of this invaluable experience.”

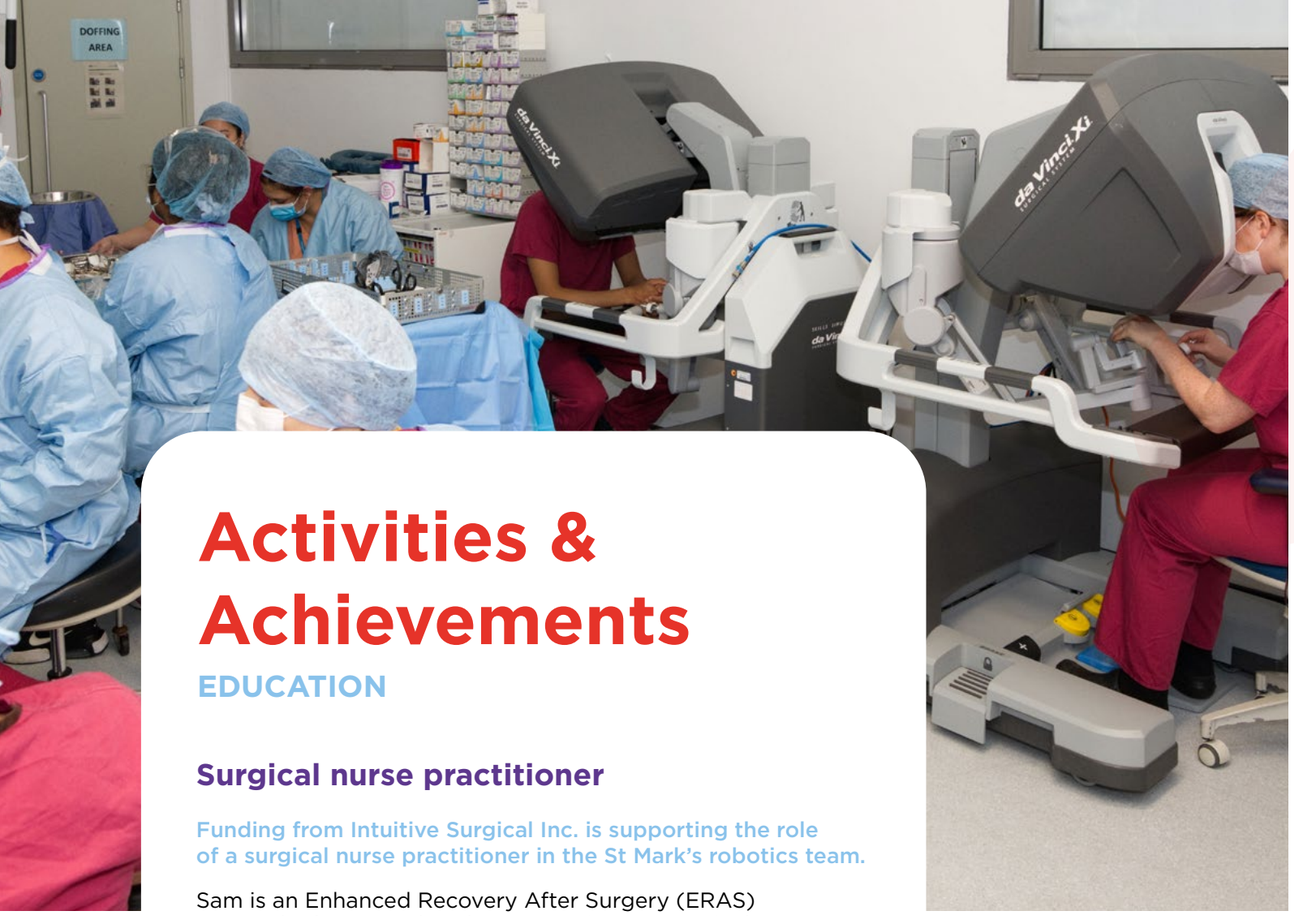
Mr Mackenzie is now a Consultant Colorectal Surgeon at an NHS Trust in Plymouth which has a surgical robot.

Mr Miskovic with some of the surgeons he has mentored as part of the robotics fellowship

“St Mark’s is a world-famous colorectal hospital with a high volume of colorectal cancer and has recently acquired the most advanced da Vinci robotics platform”

Mr Hugh Mackenzie,

The second recipient of the St Mark’s Robotics Fellowship



Activities & Achievements

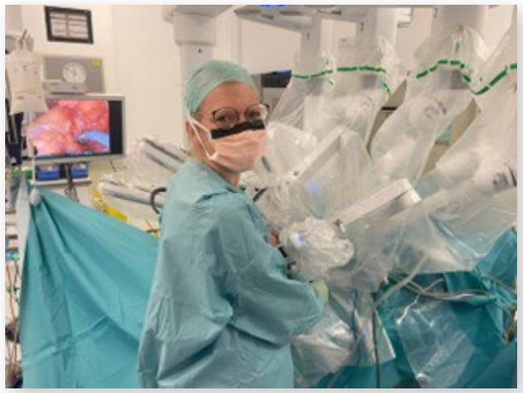
EDUCATION

Surgical nurse practitioner

Funding from Intuitive Surgical Inc. is supporting the role of a surgical nurse practitioner in the St Mark's robotics team.

Sam is an Enhanced Recovery After Surgery (ERAS) nurse who has completed a Masters in MSc Surgical Care Practitioner (abdominal, pelvic, and general surgery). The British Journal of Nursing states that, 'ERAS pathways have been proven to expedite recovery after many procedures and reduce lengths of stay in hospital and surgical complications.'

While other hospitals will have their own version of this role, Sam's is unique in that she is with patients for their complete journey in hospital. We believe other hospitals are taking our lead by developing similar positions.



Sam, St Mark's Surgical Nurse Practitioner in robotics

Activities & Achievements

EDUCATION

Case observations

- To help achieve the Programme's educational objective to become a national and international training hub in robotic colorectal surgery, we continue to host surgeons with an interest in robotic colorectal surgery for case observations.
- We have now hosted more than 60 surgeons from other UK hospitals, but also overseas, including Belgium, Denmark, Ireland, Italy, France, Germany, Norway, Sweden, and Switzerland. The case observers travel to St Mark's to spend a day observing Mr Miskovic in our robotic theatre.
- In addition, through St Mark's Academic Institute, we have started hosting clinical assistants and honorary observers again after the Covid-19 pandemic. These visitors have the unique opportunity to see live robotic colorectal surgery, adding immeasurable value to their St Mark's experience and surgical repertoire.
- Regularly hosting visitors will further establish our credentials as a provider of robotic colorectal education and ensure that high operating standards are maintained amongst robotic colorectal surgeons.

Activities & Achievements

EDUCATION

Robotics courses

The first St Mark's-developed robotics course took place in 2019, attracting surgeons from other UK hospitals. A series of further courses are planned.

In addition to St Mark's-led initiatives, we recognise that some endeavours can be more effective through collaboration with organisations with the right facilities and expertise. The Griffin Institute (formerly Northwick Park Institute for Medical Research) is located at our Northwick Park Hospital site and is a European training centre in robotics following the establishment of an Intuitive Surgical Inc.-funded robotics suite. Mr Miskovic is on the faculty for robotics courses developed by the unit.

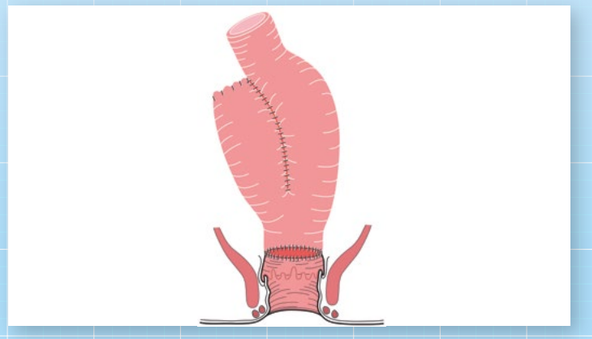
Conclusion

St Mark's has been at the forefront of bowel disease research and clinical care for almost 200 years. In the 1970s and 2000s, for example, St Mark's made significant contributions to the field:

- Surgeons from St Mark's developed the ileoanal pouch in the 1970s. It remains a key option for patients with ulcerative colitis, a type of IBD, and familial adenomatous polyposis, a rare, inherited cancer predisposition syndrome. As described, St Mark's has recently undertaken pouch surgery using minimally invasive robotic technology, contributing new knowledge to an area of surgery it originally pioneered.

- Minimally invasive surgical and endoscopic techniques were developed for early bowel cancer to facilitate more precise removal of the disease while preserving as much healthy tissue as possible: FLEX, TASER, Speedboat.

Likewise, with charitable support, 2018 was a milestone year as St Mark's launched a robotics programme for colorectal and anorectal surgery and began the step-change in its surgical practice.



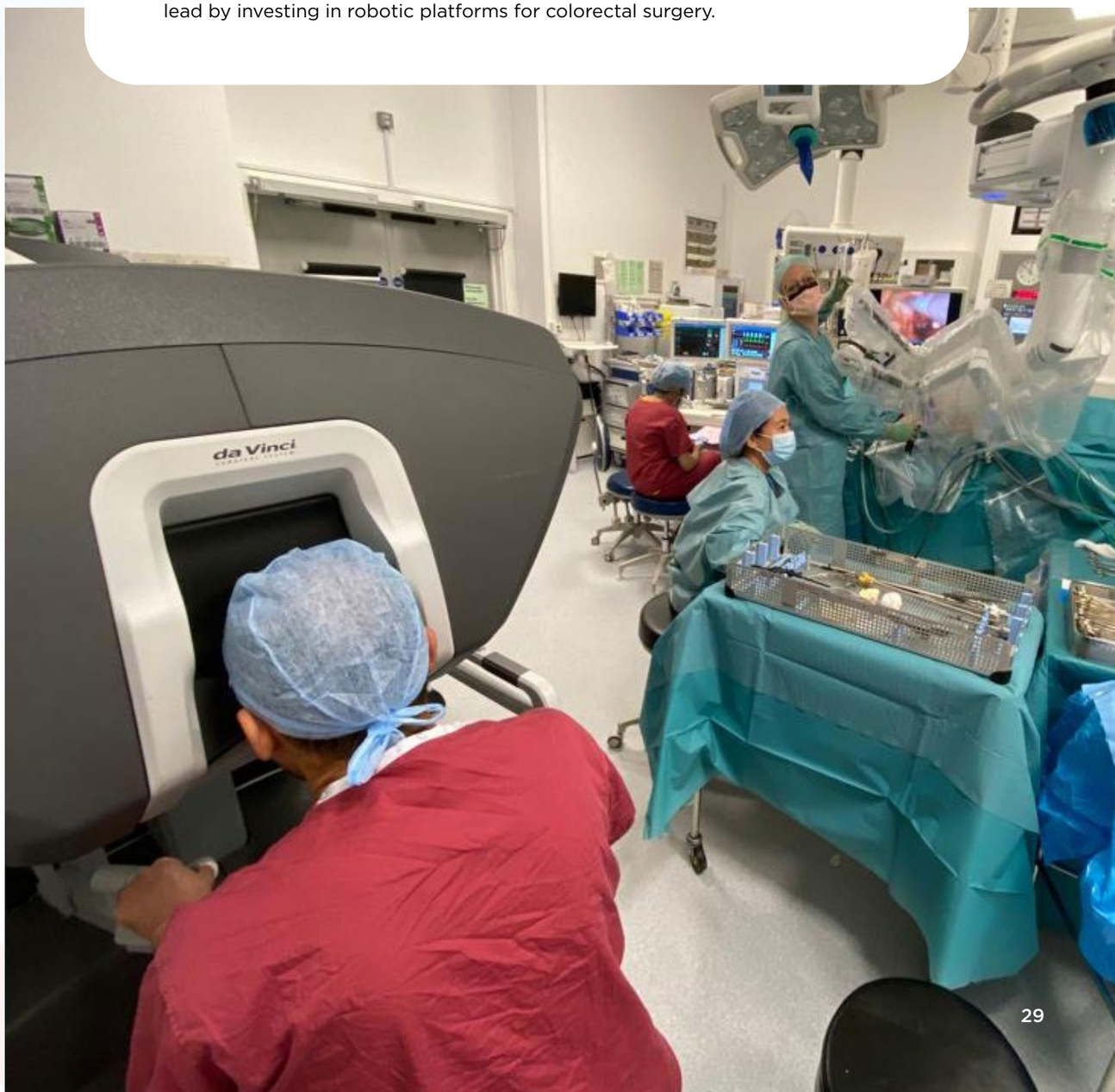
A medical illustration of the ileoanal pouch operation; image courtesy of Steve Preston, Head of Media and Digital Production, St Mark's

- In 2018, St Mark's positioned itself to become one of the few hospitals in the UK to incorporate robotic technology into its colorectal surgery practice and become a provider of robotic colorectal education.

- The St Mark's robotics team continues to perform the procedures of eligible surgical patients using this minimally invasive and innovative technology.

- Our most recent robot operation data supports the growing body of research showing that robotic technology can help to reduce patient readmissions and preserve more healthy tissue during surgery.

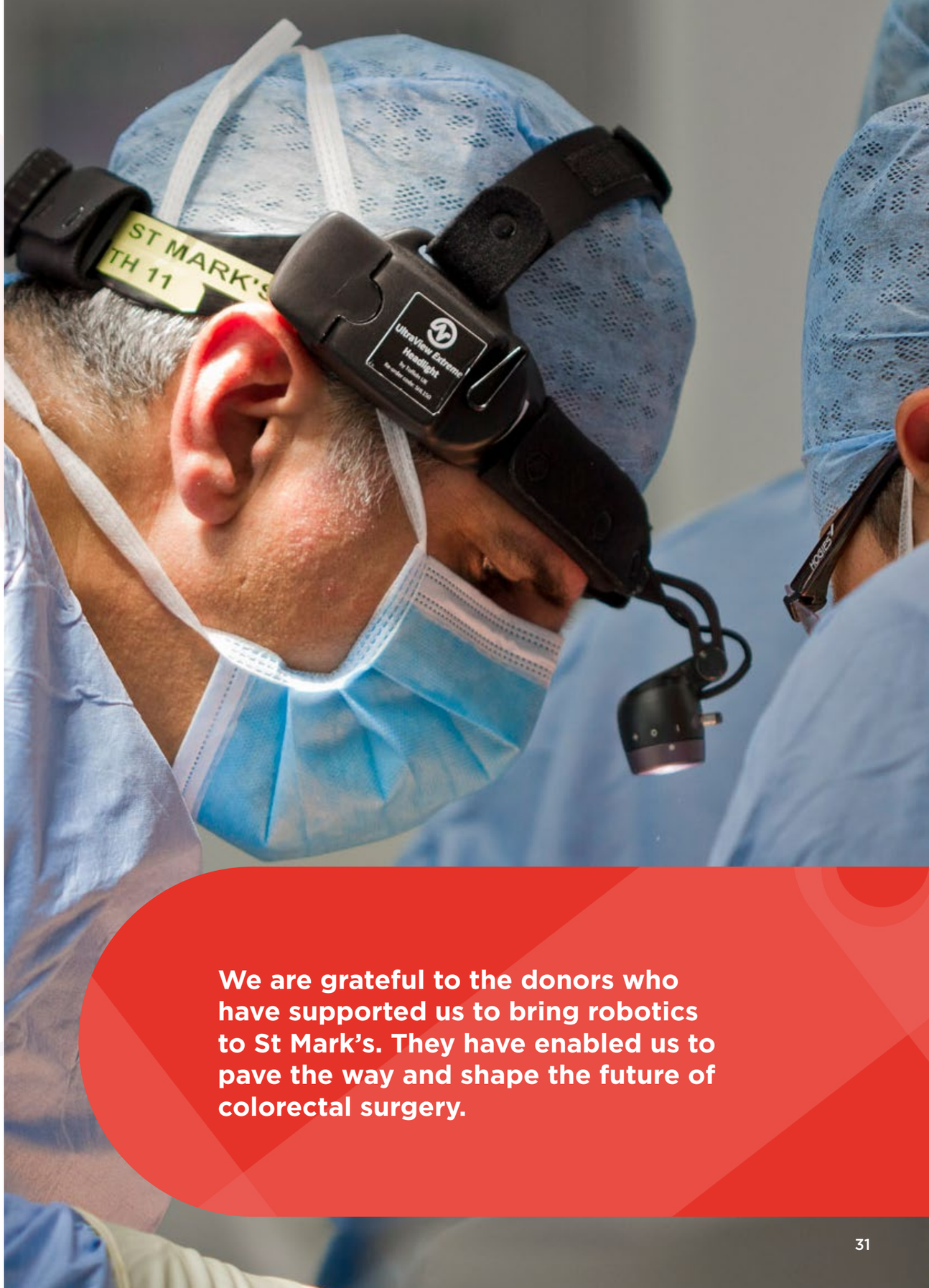
- Since 2018, despite the forced interruption of the Covid-19 pandemic on surgical activity, St Mark's robotics programme has earned a highly regarded reputation in the UK and Europe, and we believe that other UK hospitals have followed our lead by investing in robotic platforms for colorectal surgery.



We look forward to maintaining and taking forward the progress that the St Mark's robotics team has made so that they can continue to:

- Contribute robot operation outcome data to national and international collaborative groups on the technique's efficacy.
- Compile the evidence on robotic colorectal surgery through research and subsequently publish robot-related findings in high-impact, peer-reviewed journals.
- Develop their credentials in robotic colorectal education by attracting even more case observers and enhancing the educational experience of other visitors to strengthen the UK-wide and global perception of St Mark's as a leader in this area.

We were delighted to be able to seed fund the Programme with charitable support, beginning with a defined period of fundraising in 2018 to meet the campaign's first milestone, and then continued fundraising until 2021. With the support of our donors, we contributed more than £800,000 to the Programme. In 2022, financial responsibility for the surgical robot transferred to our NHS Trust. The Trust is now looking to acquire more robotic systems.



We are grateful to the donors who have supported us to bring robotics to St Mark's. They have enabled us to pave the way and shape the future of colorectal surgery.

ST MARK'S
HOSPITAL
FOUNDATION

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