

Job Description for NIHR Academic Clinical Fellowship in Cardiology IMT1

1. Job Title. Academic Clinical Fellow in Cardiology and Internal Medicine (IMT1)

2. Duration of post.

This post will commence at level IMT1 and will last for up to three years. During this post the trainee will acquire clinical competencies in medicine. They will spend 25% of their time in research across the three-year duration of the post. During the research block applicants will gain exposure to a variety of aspects of undergraduate and postgraduate medical education and associated research and will be expected to use this time to prepare pilot data and an application for funding for a research fellowship. At the end of the programme, they will either go on to full time research (as approved out-of-programme experience, if they have been successful in obtaining funding, or will have the option to return to clinical training at an appropriate level based on clinical benchmarking). The ACF will provide broad training in medicine, equivalent to Internal Medical Training, so that fellows choosing to exit clinical academic training and return to clinical practice will be eligible to compete to sub-specialise in any medical sub-specialty if their specialist interest changes. The fellow will be appointed at IMT1 for 3 years. It should be emphasised that within the South Thames Deanery this is **not** a run-through post. At the end of the ACF period the fellow will be required to apply for Cardiology sub-specialist training at ST4 in open competition.

3. Research institutions in which training will take place

St George's Hospital, and other hospitals within the London and South East Region (LaSE) (South Thames Deanery).

4. Timetabling of clinical and research time:

The ACF will spend 9/36 months in research. This is usually spread evenly throughout the three years e.g. three months in every year, but other flexible options can be sought, provided key rotations in IMT are not missed. The timetabling will be reviewed and agreed with the trainee and the IMT TPD.

5. Description of research component of programme:

The trainee will be based in the Cardiovascular and Genomics Research Institute at City St George's, University of London and will have access range to a wide range of possible research and training opportunities in academic cardiology working with one of the lead investigators within the Cardiology research Centre, part of the Cardiovascular clinical Academic group (CV-CAG). Members of the research centre are nationally and internationally recognised in their fields and have interests in: cardiac arrhythmias (Professor Elijah Behr, Professor John Camm, Dr Magdi Saba, Dr Mark Gallagher, Dr Mark Specterman); sudden death and inherited cardiac diseases (Professor Mary Sheppard, Professor Behr, Professor Sanjay Sharma, Dr Michael Papadakis, Dr Mark Specterman and Dr Maite Tome); cardiac pathology and morphology (Professor Sheppard and Dr Angeliki Asimaki); cardiac genetics (Professor Behr and Dr Marta Futema); sports cardiology (Professor

Sharma and Dr. Papadakis); cardiac imaging (Dr. Raj Sharma, Dr. Lisa Anderson, Dr Kris Knott and Dr Taigang He); and coronary artery disease (Dr James Spratt).

NIHR posts are supported by research, training and travel grants. Application to an external funding organisation for project grant support would be encouraged and supported, and City St George's has an excellent record of obtaining fellowship funding. Further information can be obtained at <https://www.citystgeorges.ac.uk/research>.

In year 1, the successfully appointed ACF will have the opportunity to meet with the various Professors and Senior Lecturers in order to identify the opportunities for research projects and supervision. By the end of year one the Fellow should have developed a relationship leading to an agreement with the leader of one of the groups for support and guidance in a research project.

Once they join the Centre for Cardiology, they will commence work on their chosen project but will also have the opportunity to take part in a range of further educational activities to stimulate their interest, which include weekly research as well as other departmental and educational meetings. The cardiology department runs the MSc Sports cardiology and the MSc Heart failure allowing opportunities for education teaching and training. Time-permitting, they will also have the opportunity to avail of some of the cardiology training opportunities available at St George's Hospital (see below).

Current Research projects offered in the Unit

There are multiple opportunities for clinical, translational and basic science research projects including cohort studies in general population screening, cardiomyopathies, athlete's heart, sports cardiology, aortopathy, inherited arrhythmias, cardiac pathology, cardiac involvement of neuromuscular diseases, cardiac amyloidosis, sudden cardiac death. More specific options are described below:

Sudden cardiac death (SCD):

The St George's SCD in the young (SCDY) Biobank (Sheppard, Behr) undertakes systematic processing of tissue from multiple cardiac chambers of over 1000 hearts from referred cases of SCD (SADS and cardiomyopathy). These undergo high resolution digital pathology with automated quantification of fibrosis and immunohistochemical markers and RNA/DNA extraction. Linked splenic tissue undergoes DNA extraction and genetic studies. Relatives of SCD cases and patients recruited through the Rare Arrhythmia Syndrome Evaluation (RASE) consortium have deep phenotyping including AI analyses of advanced wearable electrocardiography (Behr). This has created a unique 'research ready' digital pathology platform with the potential for multi-omics correlated to genetic and familial diagnoses. Furthermore, this permits the advancement of mechanistic and functional understanding of SCD including basic scientific molecular and electrophysiological studies to investigate the potential therapeutic targets emerging from -omic work (Asimaki, Specterman, Greenwood, Futema). The methodology chosen may be basic translational and novel functional approaches: heterologous expression system, induced pluripotent stem cell derived, murine and zebra-fish whole heart and isolated primary cell models. This will include basic cellular electrophysiology, biochemical, molecular biological and immunohistochemical techniques. All the facilities and resources for these techniques are in progress at the institution. Training can be

provided into these techniques as necessary as an excellent grounding for further career research in this field. We also collaborate closely with Queen Mary University of London (Tinker, Munroe). The successful candidate ACF will be able to develop projects based upon these resources and mentored by relevant team members.

Cardiovascular adaptation in inherited aortopathies:

St George's hospital Inherited Aortopathy clinic (Tome) is one of the largest of its kind. Patients undergo follow up and prospective characterization with sequential imaging, dynamic testing and genetic analysis. The postholder would have the opportunity to access large imaging data sets for analysis, hypothesis generation and pilot data set for AI projects amongst others.

Cardio-obstetrics in inherited cardiac conditions:

St George's hospital has one of the busiest high-risk pregnancy units of the country, along with the Maternal health team (Dr Ingrid Watt-Coote), Dr Tome runs a high-risk cardiomyopathy and Aortopathy joint cardio-obstetric clinic, with ICC input from Prof Behr for inherited arrhythmia patients. The post holder would have the opportunity to access a large number of patients for prospective and retrospective projects as well as formulate and collaborate in future research in the field.

Physiological exercise remodelling and arrhythmogenic cardiomyopathy:

Individuals participating in regular, intensive exercise, develop significant right ventricular (RV) adaptations which overlap with arrhythmogenic right ventricular cardiomyopathy (ARVC). 46% of athletes exhibit RV dilatation which overlaps with "major" diagnostic criteria for ARVC and 12% exhibit mildly impaired systolic function. Differentiation between the two entities is critical given the association of ARVC with exercise-induced malignant arrhythmias and sudden cardiac death. Proposed algorithms rely on the evaluation of several "pragmatic" parameters, which assess RV structure and function at rest. Our group recently proposed the use of dynamic imaging testing to differentiate physiological LV dilatation from dilated cardiomyopathy. The objective of the study is to evaluate the role of a cascade of investigations to differentiate between RV adaptation to exercise and ARVC, focusing on the role of exercise echocardiography and exercise cardiac MRI. The study groups will consist of 1. Individuals with a diagnosis of ARVC and mild structural phenotype defined as RV dilatation and RV dysfunction that falls within the echocardiographic and MRI values reported in endurance athletes, 2. Asymptomatic athletes who participate in regular intensive exercise with an enlarged RV and mildly impaired systolic function, 3. Asymptomatic athletes who participate in regular intensive exercise with normal RV size and systolic function. All individuals will undergo comprehensive clinical evaluation.

Value of ECG in identifying disease in young individuals:

The electrocardiogram (ECG) is used as the primary screening tool for detecting conditions associated with sudden cardiac arrest (SCA) and SCD in young (<35 years) individuals. ECG phenotypes, such as T-wave inversion, are well established markers of disease, which should prompt further evaluation. There are, however, several ECG indices whose value is uncertain. Moreover, the utility of an ECG artificial intelligence (AI) model, such as deep-learning convolutional neural networks, in detecting cardiac disease and preventing SCA/SCD in this population group remains largely unexplored. Our group holds an ever-expanding dataset of more than 150,000 consecutive individuals who underwent voluntary cardiac screening with a health questionnaire (HQ),

electrocardiogram (ECG) and clinical consultation. Clinical outcomes are sourced (diagnosis of a condition, SCA, SCD) from the Office for National Statistics-Hospital-Episode-Statistics database and an online HQ. The aim of the project is to investigate the value of less well-established ECG indices (QRS fragmentation, poor R-wave progression, low QRS voltages to name a few) and assess the utility of AI in identifying disease and SCA/SCD prevention.

The department is supported by a Clinical Research Facility and has an active portfolio of NIHR commercial, non-commercial and academic studies.

6. Description of clinical training component of programme:

The successful candidate will undergo their Internal Medicine Training in SW sector in London; 25% of their time will be dedicated to research time which translates to 3 months in each year of IMY1-3 training years. Internal Medicine Training (IMT) forms the first stage of specialty training for most doctors training in physician-based specialties and will prepare trainees for participating in the acute medical take at a senior level and managing patients with acute and chronic medical problems in outpatient and inpatient settings. It is a three-year programme which will continue to develop doctors to become a medical registrar and provide them with the skills needed to manage patients presenting with a wide range of general medical symptoms, with an emphasis on comorbidity and an ageing population.

Although Academic trainees are supernumerary, experience managing the acute unselected take is mandatory as is experience in Intensive care Medicine, Geriatric Medicine and outpatients. Trainees will receive simulation training during their programme. The Annual Review of Competency Progression (ARCP) decision aid defines the targets that have to be achieved for a satisfactory ARCP outcome at the end of each training year for trainees in IMT and can be accessed via this link <https://www.thefederation.uk/document/imt-arcp-decision-aid-2019-2022-update>

Academic Clinical Fellows will join the IMT (Internal Medicine Training) Programme at St George's Hospital. This will allow training in core medical specialties. The training programme will allow Fellows to achieve competencies sufficient for ST4 entry to specialist training (please see JRCPTB website for further details <https://www.jrcptb.org.uk/new-internal-medicine-curriculum>).

Clinical training will take place in rotational posts based at St George's University Hospitals NHS Foundation Trust in London. St George's Hospital has a great strategic advantage as the main healthcare provider in Southwest London and thereby covers the broad range of medical specialties required to complete medical training, including cardiology, neurology, renal and respiratory medicine, oncology, haematology, gastroenterology, dermatology and rheumatology. It is a regional centre for Cardiology including sub-specialty interests in cardiac disease in the young, Marfan's syndrome and pulmonary hypertension. St George's also houses the Atkinson Morley Neurology wing, Neurosciences, Stroke and Dementia services, Infectious Diseases, Trauma and Orthopaedics, Surgery, Paediatrics, Obstetrics and Gynaecology.

The first two years (IMT1/2) will comprise medical specialty rotations at St George's and associated hospitals (e.g., Atkinson Morley, Queen Mary Roehampton, St. John's therapy centre). The clinical

experience will reflect the varied and widespread experience of IMT and will include attachments to acute medical care, care of the elderly and intensive care. Clinical training in cardiology and general internal medicine at IMT level will be undertaken at St George's (further details outlined below).

St George's Hospital, situated in southwest London, is one of the largest NHS Trusts in London, serving a large and diverse population. It provides academically led acute and specialist services, both locally and to patients from throughout the United Kingdom and abroad. St George's Hospital balances the provision of highly rated specialist services with providing acute services to the local populations of Wandsworth, Merton and Sutton and provides specialist services to the southwest region. With nearly 8,000 dedicated staff, St George's is the largest healthcare provider in Southwest London. St George's Hospital also hosts the St George's, University of London and Kingston University Faculty of Health and Social Care Sciences, which is responsible for training a wide range of healthcare professionals from across the region.

St George's Healthcare serves a population of 1.3 million across Southwest London. As well as acute hospital services, we provide a wide variety of specialist care and a full range of community services to patients of all ages. A large number of services, such as cardiothoracic medicine and surgery, neurosciences, and renal transplantation, also cover significant populations from Surrey and Sussex, totalling around 3.5 million people. A number of our services are members of established clinical networks which bring together doctors, nurses, and other clinicians from a range of healthcare providers working to improve the quality of services for patients. These include the designated heart attack centre, hyper-acute stroke unit and major trauma centre.

Clinical training in Cardiology at St George's Hospital:

The Cardiothoracic Clinical Directorate comprises the three Care Groups: Cardiology, Cardiothoracic Surgery (Jointly the Cardiothoracic Unit) and the Vascular Care Group.

The Cardiothoracic unit provides services in cardiology, cardiac surgery, chest medicine and thoracic surgery. In September 2003 the Unit moved into a new purpose built, state of the art building on the St George's site – the Atkinson Morley Wing. The expanded facilities comprise three cardiothoracic wards (233 inpatient and day-case beds), a day case ward, coronary care unit and dedicated cardiothoracic intensive care unit. There are three cardiothoracic operating theatres, a suite of five cardiac catheter laboratories and dedicated outpatient facilities – nine cardiothoracic outpatient rooms, a rehabilitation suite and a clinical investigation area (ECG, Echocardiography, Pacing Clinic and X-ray). A 3-T 32-channel Philips Achieva MR scanner is located in the department and shared jointly between Cardiology and Neurology. The full range of adult non-invasive, invasive and interventional cardiology is provided at St. George's to a catchment area comprising South West London and large parts of Surrey and Sussex.

The outpatient and in-patient services are high volume and deal with all aspects of arrhythmia including atrial fibrillation, ventricular tachyarrhythmias and other complex arrhythmias referred from across the South-West London and the Surrey region and beyond. These are supported by two arrhythmia nurses. We offer a specialist VT ablation service as well as basic and complex ablation supported by advanced technologies (CARTO: Smart Touch, PASO and Confidence; Velocity,

Precision and ESI array; Rhythmia; and Cryoablation technologies including ARCTIC Front). There are also plans for major investment in new technological platforms to support our ongoing and developing research interests in clinical and invasive electrophysiology. These include AF ablation, epicardial VT ablation and novel EP studies and epicardial ablation in the Brugada syndrome.

Device therapy for prevention of sudden death consists of standard transvenous and cardiac resynchronisation therapy for heart failure. Lead extraction services are provided to the region including Surrey with excellent outcomes. Our pacing and ICD clinics are delivered by a superb physiology team lead and trained by Mrs Sue Jones with routine pre-counselling service and a 24/7 service dedicated to patient support and advice.

The Inherited Cardiac Conditions (ICC) service is provided by Dr Maite Tome, Dr Papadakis, Professor Sanjay Sharma, Dr Specterman and Professor Elijah Behr who have a world-renowned reputation in the cardiomyopathies and ion channelopathies. The ICC service at St George's hospital has been in existence since the 1990s but has grown 3-fold since 2010 and is now the second largest in the country. The service receives referrals from local cardiologists (catchment population over 1 million) and numerous referrals from consultants nationally. It provides an integrated 'one-stop' assessment from a multi-disciplinary team in accordance with Chapter 8 of the National Service Framework and aims to identify individuals who are symptomatic and/or at risk of sudden death from inherited conditions and treat them appropriately, including ICD implantation. The service focuses on families with unexplained sudden deaths (SADS) and ion channel diseases such as the long QT and Brugada syndromes and cardiomyopathy such as arrhythmogenic right ventricular cardiomyopathy (ARVC), hypertrophic cardiomyopathy (HCM) and dilated cardiomyopathy. There are two full time nurses attached to the clinic as well as weekly sessions from a nurse genetics counsellor and a clinic coordinator.

St George's runs the only dedicated sports cardiology clinic in the UK. The clinic is sponsored by the charity Cardiac Risk in the Young and serves the Football Association, Premier Rugby League and Union, the Lawn Tennis Association and the English institute of sport. The predominant aim of the clinic is to manage athletes with cardiac symptoms, to differentiate cardiac changes from physiological adaptation to exercise from cardiac pathology and to provide exercise prescription for athletes recovering from a cardiac illness.

Cardiology training will be designed to enable the trainee to achieve competencies required by the national curriculum, approved by the Postgraduate Medical Education and Training Board (PMETB) and provided the lecturer is of sufficient seniority (ST5+) to attain their CCT in Cardiology and ICC. Training in inherited heart disease diagnosis and management will be provided in keeping with curriculum development. Clinical work will include a fixed on-call commitment, 1.5 clinics/ week in ICC and general cardiology, training in general cardiology and GIM if still required and otherwise: device implantation, cardiac resynchronisation therapy, cardiac electrophysiological studies and ablation of simple and complex arrhythmias; training in chronic disease management of arrhythmias.

7. Academic Programme Director name

Academic Lead (University) for the IAT Programme
Professor Nidhi Sofat, Professor of Rheumatology (St George's, University of London),
Consultant Rheumatologist (St George's University Hospitals NHS Foundation Trust,
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Academic Lead for Cardiology
Professor Elijah Behr, Professor of Cardiovascular Medicine, St George's, University of London
Honorary Consultant Cardiologist and Electrophysiologist, St. George's University Hospitals NHS
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8. Clinical Programme Director name

Dr Manav Sohal
Consultant Cardiologist
Cardiology Care Group Lead

9. Programme contact for further information (phone or email)

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10. HEE contact

Specialty Team <https://lasepgmdesupport.hee.nhs.uk/support/home>
Recruitment Enquiries - <https://lasepgmdesupport.hee.nhs.uk/support/home>

11. Useful websites for further information

<https://www.nihr.ac.uk/explore-nihr/academy-programmes/integrated-academic-training.htm>

12. Confirmation that the post attracts an NTN: NTN in IMT. NOT a NTN in Cardiology

This job description was prepared on 04/09/2026