Curriculum Vitae

Dr Ross Hunter MRCP, PhD, MBBS, BSc

#### **Personal Details**

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**GMC:** Full registration, GMC no. 6031316

Specialist registration Cardiology October 2013 <a href="http://uk.linkedin.com/pub/ross-hunter/22/801/690">http://uk.linkedin.com/pub/ross-hunter/22/801/690</a>

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### Qualifications

PhD, University of London	Jan 2014
CCT Cardiology	Oct 2013
PG Dip Cardiology & Medical Education Brighton & Sussex University Hospitals	May 2013
MRCP (London)	Feb 2005
MBBS with distinction, GKT School of Medicine	June 2001
BSc (2:1), Cardiovascular Medicine Imperial College School of Medicine	June 1998
Associate of King's College (AKC) King's College London	June 1997

#### **Prizes & Awards**

- Finalist Heart Rhythm Society (USA) young investigator award 2011
- Finalist Heart Rhythm UK young investigator award 2011
- Best abstract World Society of Arrhythmias 2011
- Best abstract in heart rhythm category British Cardiac Society 2011
- Distinction award with medical degree 2001.
- Prize for elective in cardiology in 2000.

## **Current employment**

# **Consultant Cardiologist and Electrophysiologist St Bartholomew's Hospital, London**

Sep 2013-present

St Bartholomew's is one of six hospitals making up Barts Health NHS Trust which serves the population of Northeast London and Essex. St Bartholomew's Hospital has an international reputation as a centre of excellence for electrophysiology and devices, and is a regional and national referral centre. St Bartholomew's is completely focused on arrhythmia management with complex quarternary referrals from around the country. We also run the UKs only direct admission service for arrhythmia emergencies offering the full range of pacing and ablation services 24/7.

http://www.bartshealth.nhs.uk/our-services/services-a-z/c/cardiovascular/for-clinicians/

# Clinical Senior Lecturer Queen Mary University of London

Dec 2013-present

The Cardiology Research Department at St Barthoomew's Hospital has an international reputation for electrophysiology and device research. We have a strong track record for clinical research and running clinical trials. We also have strong links with engineers at QMUL and basic medical sciences at The William Harvey Research Institute.

http://www.whri.qmul.ac.uk/cardiac-cardiology

# **Editor-in-chief, Cardiac Rhythm News**

June 2013 – present

This quarterly journal focuses on the latest scientific and clinical advances as well as industry releases relevant to heart rhythm management. It has a readership of > 3500 European and US based cardiologists.

http://www.cxvascular.com/cardiacrhythmnews

# **Previous employment**

Specialist Registrar in Cardiology and Sub-Specialty 3 St Bartholomew's Hospital, London	Frainee EP & Devices Oct 2011-present
Research fellow in EP & Devices St Bartholomew's Hospital, London	Oct 2008-Oct 2011
SpR Cardiology – Worthing Hospital	Oct 2007 – Oct 2008
SpR Cardiology & GIM - Tunbridge Wells	Oct 2006 – Oct 2007
SpR Cardiology & GIM - QEQM Hospital, Margate	Oct 2005 – Oct 2006
Cardiology SHO - Royal Brompton Hospital	Feb 2005 - Aug 2005
Medical SHO Rotation - Brighton & Sussex University Hospitals Feb 2003 - Feb 2005	
SHO in A&E - Rockhampton Base Teaching Hospital,	Queensland, Australia Aug 2002-Feb 2003
HO Orthopaedic - Guys & St Thomas's Hospital	May 2002 - Jul 2002
HO Vascular Surgery - St Thomas's Hospital	Feb 2002 - Apr 2002
HO Medicine - University Hospital Lewisham	Aug 2001 - Jan 2002

# **Clinical training**

I am a fully trained general cardiologist and am experienced in the full range of cardiology practice including management of coronary disease, heart failure and syncope. I am fully trained in diagnostic coronary angiography, trans-thoracic and trans-oesophageal echocardiography. I have sub-specialised in arrhythmia management for 6 years now and am fully trained in all aspects of electrophysiology & devices:

# **Electrophysiology**

- I have extensive experience in both conventional electrophysiology and ablation of complex atrial arrhythmias, in particular AF and atrial tachycardias.
- I am familiar with the full range of technologies used for complex ablation including contact force sensing, the Cryo-Balloon and the Hansen robot.
- My clinical research focused on catheter ablation of AF and I therefore have advanced knowledge regarding equipment and mapping systems, a thorough grasp of the literature pertaining to AF and its ablation, and detailed knowledge regarding the practical side of AF ablation including methods and end points.
- I am experienced in VT ablation both in patients with structurally normal hearts and in those with structural heart disease. I also have experience of epicardial access, mapping and ablation for VT.

#### **Devices**

- I have extensive experience of pacing for bradyarrhythmias, implantation of ICD and CRT devices, and revising these devices.
- I have also implanted the newer leadless cardiac pacemakers.
- I have experience of device extraction and am familiar with the equipment used at St Bartholomew's, in particular the Evolution cutting sheath, and the Byrd femoral work station.
- I am experienced in troubleshooting of devices, device programming, and managing complications of device therapy.

# **General Cardiology**

- Fully competent in trans-thoracic and trans-oesophageal echocardiography, with experience of cardiac CT and MRI.
- Fully competent with coronary angiography, and experience of PCI/primary PCI.
- Experience in heart failure clinics and supporting heart failure nurses.
- Experience managing patients with congenital heart disease.
- Experience managing cardiac surgical patients and the overlap with ITU.

#### Research

## Research experience

I have been involved in research for 15 years now and it has become one of my passions. I hope to continue this and indeed take it to another level with a consultant job at Barts and collaboration both within UCL Partners and beyond, and in so doing enhance the department which is now part of the largest Academic Health Science System in the world. I envisage a system where findings can immediately be translated directly into improved outcomes for our patients.

- Prior to working at Barts I had experience of in vitro pharmacology from my BSc, and subsequently worked as a research fellow at King's College London whilst a medical student and junior doctor gaining laboratory experience in biochemistry.
- During my 5 years at Barts my clinical research has always been directly aimed at answering clinical questions to improve patient care and outcomes. I have focused predominantly on catheter ablation of AF, although I have become involved in studies pertaining to several areas of electrophysiology and devices.
- My PhD was supervised by Professor Schilling, the thesis has been submitted, the viva passed and the PhD award is imminent.
- My ongoing role in the research department has included supervision and mentoring of subsequent PhD students, helping to write protocols, to draft abstracts and manuscripts, and to prepare posters and oral presentations for national and international meetings. I have also mentored clinical colleagues in research roles and helped them write abstracts and papers and present data.

#### **Research interests**

My broad research background has enabled me to develop a number of ongoing strands drawing together several collaborations within UCL Partners:

- A randomised controlled trial examining the response to ablation of different CFAE morphologies, aiming to refine methods for catheter ablation of persistent AF. I was solely responsible for running this trial, recruiting and following up patients. Although the trial is now complete further analysis is planned.
- A collaboration with a team of biomedical engineers at QMUL led by Professor Wen Wang to establish a model investigating the impact of atrial wall stress on electrophysiologic remodelling in AF. We are also investigating whether this model might be used clinically to assist catheter ablation of AF.
- A randomised trial comparing catheter ablation to medical treatment of persistent AF in heart failure. I was solely responsible for running the trial during my time at Barts, recruiting and following up patients.
- Compiling an international multicenter registry to examine factors predicting outcome after catheter ablation of AF.
- A collaboration with the cardiac MRI team led by Dr Steffen Petersen at the London Chest Hospital imaging left atrial scar and ablation lesions. We hope to extend this work to evaluate the clinical utility of MRI in the context of VT ablation.
- Collaboration with a team of basic medical scientists led by Professor Tinker at the WHRI. Surgical samples of cardiac tissue are being analysed to provide insight into mechanisms maintaining AF. This translational work examines cellular and tissue behaviour and may provide novel therapeutic targets in AF.

Collaboration with a team of epidemiologists led by Professor Hemingway at UCL
examining patient computer records by linking a number of key UK primary and
secondary care databases (the CALIBER dataset). This unprecedented volume
of data should provide definitive answers regarding the epidemiology of AF for
the first time, potentially allowing our unit to devise preventative strategies.

#### **Grants**

Grants I have been named on are:

- The National Institute for Health Research Cardiovascular Biomedical Research Unit at Barts and the London. Co-applicant on grant to study MR imaging of scar post AF ablation. February 2010. St Barts Hospital (£21 000).
- British Heart Foundation. Co-applicant on grant for the catheter ablation versus medical treatment of AF in heart failure (CAMTAF) trial. January 2009, St Barts Hospital, PG/08/130 (£245 801).
- Royal Society & the Japanese Society for Promotion of Science. Grant for academic visit to Japan (University Hospital Kobe, University Hospital Shiga, University of Kyushu Hospital) August 2004, King's College London (£3500).
- Royal Society. Grant for academic visit to University Hospital Kobe Japan August 2003, King's College London (£1500).
- Royal College of Pathologist. Grant for elective project. October 2000, King's College London (£600).

# Peer review for journals

As a result of my publishing with several journals I am now also a reviewer for some of these, including *Circulation: Arrhythmia & Electrophysiology, Journal of the American Heart Association*, and the *British Medical Journal*.

## **Research presentations**

I have presented over 20 times at national or international conferences. Recent examples are:

- Cryoballoon versus radiofrequency ablation of paroxysmal AF. Late breaking clinical trial session, Heart Rhythm Society May 2014
- Invited lecture: 'Impact of targeting fractionated electrograms on outcome after catheter ablation of AF.' ECAS 2013.
- Oral presentation as finalist for young investigator award: 'Characterisation of fractionated electrograms critical for maintenance of AF: a randomised controlled trial of ablation strategies.' Heart Rhythm UK 2011.
- Oral presentation as finalist for young investigator award: 'Characterisation of fractionated electrograms critical for maintenance of AF: a randomised controlled trial of ablation strategies.' Heart Rhythm Society (USA) 2011.
- Oral presentation: 'Catheter ablation versus medical treatment of AF in Heart failure: the CAMTAF trial.' Heart Rhythm UK 2011.
- Oral presentation: 'Does catheter ablation of AF reduce risk of stroke and death?' Heart Rhythm Society (USA) 2011.

# **Publications**

# Publications in peer review journals

- 1. Ullah W, McLean A, Hunter RJ, Baker V, Richmond L, Cantor EJ, Dhinoja MB, Sporton S, Earley MJ, Schilling RJ. Randomized trial comparing robotic to manual ablation for atrial fibrillation. Heart Rhythm. 2014: published online first
- 2. Page SP, Herring N, Hunter RJ, Withycombe E, Wali G, Betts T, Bashir Y, Dhinoja M, Earley MJ, Sporton SC, Rajappan K, Schilling RJ, Peri-procedural stroke risk in patients undergoing catheter ablation for atrial fibrillation using an uninterrupted warfarin protocol. Journal of Cardiovascular Electrophysiology 2014: 25;585-90.
- 3. Ullah W, Hunter RJ, Baker V, Dhinoja MB, Sporton S, Earley M, Schilling RJ. Target Indices for Clinical Ablation in Atrial Fibrillation: Insights from Contact Force, Electrogram and Biophysical Parameter Analysis. Circ Arrhythm Electrophysiol. 2014: 7; 63-8.
- 4. Hunter RJ, Berriman TJ, Diab I, Kamdar R, Richmond L, Baker V, Goromonzi F, Sawhney V, Duncan E, Page SP, Ullah W, Unsworth B, Mayet J, Dhinoja M, Earley MJ, Sporton S, Schilling RJ. A Randomised Controlled Trial of Catheter Ablation versus Medical Treatment of Atrial Fibrillation in Heart Failure (THE CAMTAF TRIAL). Circ Arrhythm Electrophysiol. 2014: 7;31-8.
- 5. Ceelen F, Hunter RJ, Boubertakh R, Sommer WH, Armbruster M, Schilling RJ, Petersen SE. Effect of atrial fibrillation ablation on myocardial function: insights from cardiac magnetic resonance feature tracking analysis. Int J Cardiovasc Imaging. 2013: 29;1807-17.
- 6. Herring N, Page SP, Ahmed M, Burg M, Hunter RJ, Earley MJ, Sporton SC, Bashir Y, Betts TR, Schilling RJ, Rajappan K. The prevalence of low left atrial appendage emptying velocity and thrombus in patients undergoing catheter ablation for atrial fibrillation on uninterrupted peri-procedural warfarin therapy. Journal of Atrial Fibrillation. 2014: published online first.
- 7. Malcolme-Lawes LC, Juli C, Karim R, Bai W, Quest R, Lim PB, Jamil-Copley S, Kojodjojo P, Ariff B, Davies DW, Rueckert D, Hunter RJ, Jones D, Boubertakh R, Petersen SE, Schilling RJ, Kanagaratnam P, Peters NS. Automated analysis of atrial late gadolinium enhancement imaging correlates with endocardial voltage and clinical outcomes; a two-centre study. Heart Rhythm 2013: 10; 1184-91.
- 8. Hunter RJ, Jones DA, Boubertakh R, Molcolme-Lawes LC, Kanagaratnam P, Juli CF, Davies DW, Peters NS, Baker V, Goromonzi F, Richmond L, Earley MJ, Sporton S, Schaeffter T, Davies C, Westwood W, Petersen SE, Schilling RJ. Diagnostic accuracy of cardiac magnetic resonance imaging in the detection and characterization of left atrial catheter ablation lesions: a multicenter experience. Journal of Cardiovascular Electrophysiology. 2013: 24; 396-403.
- 9. Cheung VT, Hunter RJ, Ginks MR, Schilling RJ, Earley MJ, Bowles L. Management of thrombo-embolic risk in persons with haemophilia and atrial

- fibrillation: is left atrial appendage occlusion the answer for those at high risk? Haemophilia 2013: 19; e84-86.
- 10.D'Ascenzo F, Corleto A, Biondi-Zoccai G, Anselmino M, Ferraris F, di Biase L, Natale A, Hunter RJ, Schilling RJ, Miyazaki S, Tada H, Yenn-Jiang L, Tao H, Ma C, Packer D, Hammill S, Gaita F. Which are the most reliable predictors of recurrence of atrial fibrillation after transcatheter ablation. Int J Cardiol 2013: 167: 1984-9.
- 11.Duncan ER, Finlay M, Page S, Hunter R, Goromonzi F, Richmond L, Baker V, Ginks M, Ezzat V, Abrams D, Dhinoja M, Earley MJ, Sporton S, Schilling RJ. Improved electrogram attenuation during ablation of paroxysmal atrial fibrillation with the Hansen robotic system. Pacing Clin Electrophysiol. 2012: 35; 730-8.
- 12. Hunter RJ, Liu YK, Lu Y, Wang W, Schilling RJ. Left atrial wall stress distribution and its relationship to electrophysiologic abnormalities in patients with persistent atrial fibrillation. Circ Arrhythm Electrophysiol. 2012: 5; 351-60.
- 13. Finlay M, Hunter RJ, Mullen V, Richmond L, Goromonzi F, Sporton S, Dhinoja M, Thomas G, Rajappan K, Duncan E, Tayebjee M, Earley M, Schilling RJ. A randomised comparison of CArtomerge VERsus NavX fusion in the catheter ablation of atrial fibrillation (The CAVERN Trial). J Interv Card Electrophysiol. 2012: 33;161-9.
- 14. Chahal CAA, Ali O, Hunter RJ, Schilling RJ. Impact of controlling atrial fibrillation on outcomes relevant to the patient: focus on dronedarone. Patient Related Outcome Measures 2012:3;95-103.
- 15. Hunter RJ, Diab I, Richmond L, Tayebjee M, Sporton S, Earley MJ, Schilling RJ. Characterisation of fractionated atrial electrograms critical for maintenance of AF: a randomised controlled trial of ablation strategies (the CFAE AF trial). Circ Arrhythm Electrophysiol. 2011: 6; 622-629.
- 16.Hunter RJ, McCready J, Diab I, Page SP, Finlay M, Richmond L, French A, Earley MJ, Sporton S, Jones M, Joseph JP, Bashir Y, Betts TR, Thomas G, Staniforth A, Kistler P, Rajappan K, Chow A, Schilling RJ. Maintenance of sinus rhythm with an ablation strategy in patients with atrial fibrillation is associated with a lower risk of stroke and death. Heart 2012: 98; 48-53.
- 17. Diab I, Hunter RJ, Kamdar R, Berriman T, Duncan E, Richmond L, Baker V, Abrams D, Earley M, Sporton S, Schilling RJ. Does Ventricular Dyssynchrony on Echocardiography Predict response to Cardiac Resynchronisation Therapy? A randomised controlled study. Heart 2011: 97;1410-16.
- 18. Tayebjee M, Hunter R, Baker V, Creta A, Duncan E, Sporton S, Earley M, Schilling R, Pulmonary vein isolation with radiofrequency ablation followed by cryotherapy: A novel strategy to improve clinical outcomes following catheter ablation of paroxysmal atrial fibrillation. Europace 2011: 13;1250-5.
- 19.Page SP, Siddiqui MS, Finlay M, Hunter R, Abrams D, Dhinoja M, Earley M, Sporton S, Schilling RJ. Catheter ablation for atrial fibrillation on uninterrupted

- warfarin: can it be done without echo guidance? Journal of Cardiovascular electrophysiology. 2011: 22; 265-70.
- 20. Hunter RJ, Schilling RJ. New European guidelines on AF. BMJ. 2011: 342; d897.
- 21. Hunter RJ, Schilling RJ. Catheter ablation for AF: the case of the missing endpoints. Featured correspondence: author reply. Heart. 2011: 97; 87.
- 22. Hunter RJ, Schilling RJ. Catheter and surgical ablation of cardiac arrhythmias. Primary Care Cardiovascular Journal. 2010: 3; S13-17.
- 23. Hunter RJ, Schilling RJ. Long term outcome after catheter ablation for AF: safety, efficacy and impact on prognosis. Heart. 2010: 96; 1259-63.
- 24. Hunter RJ, Schilling RJ. Termination of atrial fibrillation by Flecainide: mechanistic insights from spectral analysis. Europace. 2010: 2010: 12; 453-4.
- 25. Hunter RJ, Ginks M, Ang R, Diab I, Goromonzi F, Page S, Baker V, Richmond L, Tayebjee M, Sporton S, Earley MJ, Schilling RJ. Impact of variant pulmonary vein anatomy and image integration on long term outcome after catheter ablation for AF. Europace 2010: 12; 1691-7.
- 26. Tayebjee MH, Creta A, Moder S, Hunter RJ, Earley MJ, Dhinoja MB, Schilling RJ. Impact of angiotensin converting enzyme inhibitors and angiotensin receptor blockers on long term outcome of catheter ablation for atrial fibrillation. Europace 2010: 12: 1537-42.
- 27. Hunter RJ, Berriman TJ, Diab I, Baker V, Richmond L, Thomas G, Kamdar R, Finlay M, Duncan E, Dhinoja M, Abrams D, Earley MJ, Sporton S, Schilling RJ. Long term efficacy of catheter ablation for AF: impact of additional targeting of fractionated electrograms. Heart. 2010: 96; 1372-8.
- 28. Duncan E, Thomas G, Johns N, Pfeffer C, Appanna G, Shah N, Hunter R, Finlay M, Schilling RJ, Sporton S. Do traditional VT zones improve outcome in primary prevention ICD patients? PACE. 2010: 33:1353-8.
- 29. Finlay M, Sawhney V, Schilling R, Thomas G, Duncan E, Hunter R, Virdi G, Abrams D, Sporton S, Dhinoja M, Earley M. Uninterrupted warfarin for periprocedural anticoagulation in catheter ablation of typical atrial flutter: a safe and cost-effective strategy. J Cardiovasc Electrophysiol. 2009: 11; 1587-96.
- 30. Hunter RJ, Diab I, Thomas G, Duncan E, Abrams D, Dhinoja M, Sporton S, Earley MJ, Schilling RJ. Validation of a classification system to grade fractionation in atrial fibrillation and correlation with automated detection systems. Europace 2009: 11:1587-1596.
- 31. Hunter RJ, Finlay M, Schilling RJ, Sporton S. A broad complex tachycardia with conflicting information from pacing manoeuvres. Europace. 2009; 11:1392-5.

- 32. Nakahara T, Hunter RJ, Hirano M, Uchimara H, McArdle A, Broome CS, Koll M, Martin CR, Preedy VR. Alcohol alters skeletal muscle heat shock protein gene expression in rats: these effects are moderated by gender, raised endogenous acetaldehyde and starvation. Metabolism: Clinical & Experimental. 2006: 55; 843-851.
- 33. Adachi J, Kudo R, Asano M, Ueno Y, Hunter R, Rajendram R, Martin C, Preedy VR. Skeletal muscle and liver oxysterols during fasting and alcohol exposure. Metabolism. 2006: 55; 119-127.
- 34. Hunter RJ, Patel VB, Baker AJ, Richardson PJ, Preedy VR. Differential effects of bile duct ligation and galactosamine injection as models of hepatic injury on cardiac protein metabolism. Metabolism: Clinical and Experimental. 2004: 53; 964-968.
- 35. Hunter RJ, Neagoe C, Jarvelainen HA, Martin CR, Lindros KO, Linke WA, Preedy VR. Alcohol affects the skeletal muscle proteins, titin and nebulin in male and female rats. J Nutrition. 2003: 133; 1154-1157.
- 36. Hunter RJ, Patel VB, Miell JP, Wong HJ, Marway JS, Richardson PJ, Preedy VR. Diarrhea reduces rates of cardiac protein synthesis in myofibrillar protein fractions in the rat in vivo. Journal of Nutrition. 2001: 131; 1513-1519.
- 37. Adachi J, Kudo R, Ueno Y, Hunter R, Rajendram R, Want E, Preedy VR. Heart 7-Hydroperoxycholesterol and oxysterols are elevated in chronically ethanol-fed-rats. Journal of Nutrition. 2001: 131; 2916-2920.
- 38. Kingsbury MP, Huang W, Giuliatti S, Turner M, Hunter R, Parker K, Sheridan DJ. Investigation of distal aortic compliance and vasodilator responsiveness in heart failure due to proximal aortic stenosis in the guinea pig. Clinical Science. 1999: 96; 241-251.

#### **Edited Books & Book Chapters**

I have edited 6 books and written 15 chapters in edited books, examples below:

- Hunter RJ, Schilling RJ. Comparison of different mapping technologies. In: Shenasa M, Hindricks G, Borggrefe M, Breithardt G, Josephson ME. (Editors) Cardiac Mapping 4<sup>th</sup> Edition. 2013: Chapter 5; 36-45..
- 2. Hunter RJ, Schilling RJ. Catheter ablation of AF using Ensite NavX. In: Sra J, Natale A, Wilber D, Akhtar M. (Editors) Practical Electrophysiology. 2013: in press
- 3. Hunter RJ, Schilling RJ. Catheter ablation of complex right atrial arrhythmia in a patient with a Fontan circulation using the Ensite Array. In: Sra J, Natale A, Wilber D, Akhtar M. (Editors) Practical Electrophysiology. 2013: in press

- 4. Hunter RJ, Preedy VR. Nanomedicine in health and disease. Science Publishers. 2011.
- 5. Hunter RJ, Preedy VR. Nanomedicine and the cardiovascular system. Science Publishers. 2011.
- 6. Preedy VR, Hunter RJ. Cytokines. UK: Science Publishers 2011.
- 7. Hunter RJ, Schilling RJ. Paroxysmal supraventricular tachycardia. In Oxford desk reference: Cardiology. Oxford University Press. 2011: Chapter 3.2; 66-67.
- 8. Hunter R, Peters TJ, Preedy VR. Alcohol metabolism: implications for nutrition and health. In: Human nutrition. Twelfth edition. Edited by Geissler C, Powers H. Churchill & Livingstone 2010: Chapter 9; 177-196.
- Hunter RJ, Khan A, Mullen M. Tricuspid Stenosis and double chamber right ventricle presenting with broad complex tachycardia. In: Cases in Adult Congenital Heart Disease. Edited by Gatzoulis MA, Webb GA, Broberg C, Uemura H. Churchill & Livingstone. 2009: Chapter 38; 213-218.
- 10.Nakahara T, Hunter RJ, Martin CR, Reilly ME, Preedy VR. Practical methods for determining mRNA levels in alcohol exposed tissues and its application to experimental pathology. In: Preedy V. R. and Watson, R. R. (Editors) Comprehensive handbook of alcohol related pathology Volume 3. Elsevier science 2005: 1609-1616.

**Abstracts:** over 70 in total

## **Teaching**

I have always been keen to teach others and several years ago enrolled on a postgraduate diploma in cardiology & medical education, which gave me formal training in all areas of medical education to enhance my teaching skills. This gave me a real breadth of knowledge on models of learning, teaching methods, curriculum design, assessment, quality assurance and mentoring, and has improved my teaching enormously. I continue to teach in many contexts, in particular training doctors to perform catheter ablation procedure and implant pacemakers of all types. I am also the lead for the Barts arrhythmia courses.