

Dr. James Howard MA (Cantab) MB BChir MRCP

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GMC No. 7080262

About me

I am a PhD Fellow at Imperial College London and a trainee Cardiologist. My PhD is entitled 'Machine Learning in Cardiovascular Imaging' and is supported by a prestigious Wellcome Trust PhD Fellowship. I have published extensively in the field of Cardiovascular Medicine.

I am a passionate programmer alongside my medical career. I am proficient in Python and have experience in using both Pytorch and Keras/Tensorflow. I have an excellent understanding of statistics and am proficient in the R programming language.

Education & Training

- | | |
|-------------|---|
| 2017 – 2020 | Wellcome Trust PhD Training Fellowship – Imperial College London |
| 2015 – 2020 | MSc – Clinical Trials – London School of Hygiene & Tropical Medicine |
| 2014 – 2017 | NIHR Academic Clinical Fellowship – Cardiology (Imperial College, London) |
| 2012 – 2013 | PG Cert - Medical Education (Distance Learning) – Cardiff University <ul style="list-style-type: none">• Awarded merit |
| 2012 – 2014 | Core Medical Training – London Deanery (North West Thames) |
| 2010 – 2012 | The Foundation Programme – North East Thames Foundation School |
| 2004 – 2010 | Trinity College, The University of Cambridge <ul style="list-style-type: none">• Master of Arts (ceremonial degree)• Clinical Medicine – Bachelor of Medicine, Bachelor of Surgery Champion Prize for Dermatology <ul style="list-style-type: none">• Physiology, Development and Neuroscience – Bachelor of Arts (Hons.), Class 2.i |
| 1993 – 2004 | Merchant Taylors' School for Boys <ul style="list-style-type: none">• A-levels - Biology (A), Chemistry (A), Computing (A), Physics (A), General Studies (A)• Harrison's Scholarship, Computing Prize, Shepherd Eastwood Prize |

Employment

2017 - 2020	Wellcome Trust / Imperial College 4i Clinical Research Training Fellow
2014 - 2017	Imperial College Healthcare NHS Trust – ST3–ST5 ACF Cardiology
2012 - 2014	North West London Core Medical Training – CT doctor
2010 - 2012	North East Thames Foundation Programme

MEDLINE/Pubmed Peer Reviewed Publications & Book Chapters

Paper 2019	<u>Howard</u> , Fisher, ... Francis “Cardiac Rhythm Device Identification Using Neural Networks” <i>In press</i>
Paper 2019	Cook, Ahmad, <u>Howard</u> , ... Davies “Association Between Physiological Stenosis Severity and Angina-Limited Exercise Time in Patients With Stable Coronary Artery Disease” JAMA Cardiol. 2019 May 1.
Paper 2019	Keene, Shun-Shin, ... <u>Howard</u> , ... Whinnett “Quantification of Electromechanical Coupling to Prevent Inappropriate Implantable Cardioverter-Defibrillator Shocks” <i>In press</i>
Paper 2019	Arnold, <u>Howard</u> , ... Whinnett “Right Ventricular Pacing for Hypertrophic Obstructive Cardiomyopathy: Meta-Analysis and Meta-Regression of Clinical Trials.” Eur Heart J Qual Care Clin Outcomes. 2019 Jan 31.
Paper 2019	Sau,, Al-Aidarous, <u>Howard</u> , ... Sikkell “Optimum lesion set and predictors of outcome in persistent atrial fibrillation ablation: a meta-regression analysis” Europace. 2019 May 9. pii: euz108.
Paper 2019	Seligman, Shun-Shin, ... <u>Howard</u> , ... Petraco “Fractional flow reserve derived from microcatheters versus standard pressure wires: a stenosis-level meta-analysis” Open Heart. 2019 Mar 25;6(1):e000971.
Paper 2018	Hartley, ... <u>Howard</u> , Francis “Key opinion leaders’ guide to spinning a disappointing clinical trial result” BMJ 2018; 363

- Paper
2018 Arnold, Shun-Shin, ... [Howard](#)..., Whinnett
“His resynchronization versus biventricular pacing in patients with heart failure and left bundle branch block”
[J Am Coll Cardiol. 2018 Dec 18;72\(24\):3112-3122.](#)
- Paper
2018 Warisawa, Cook, [Howard](#), ... Davies
“Physiological Pattern of Disease Assessed by Pressure-Wire Pullback Has an Influence on Fractional Flow Reserve/Instantaneous Wave-Free Ratio Discordance.”
[Circ Cardiovasc Interv. 2019 May;12\(5\):e007494.](#)
- Paper
2018 Ferreira-Martins, [Howard](#), Al-Khayatt, ... Sikkell
“Outcomes of Paroxysmal AF ablation Studies are Affected more by Study Design and Patient Mix than Ablation Technique.”
[J Cardiovasc Electrophysiol. 2018 Sep 19. doi: 10.1111/jce.13745.](#)
- Paper
2018 Ahmad, Gotberg, Cook, [Howard](#), ... Sen
“Coronary Hemodynamics in Patients With Severe Aortic Stenosis and Coronary Artery Disease Undergoing Transcatheter Aortic Valve Replacement”
[JACC Cardiovasc Interv. 2018 Aug 20. pii: S1936-8798\(18\)31521-8](#)
- Paper
2018 Cook, Ahmad, [Howard](#), ... Davies
“Impact of Percutaneous Revascularization on Exercise Hemodynamics in Patients With Stable Coronary Disease”
[J Am Coll Cardiol. 2018 Aug 28;72\(9\):970-983. doi: 10.1016/j.jacc.2018.06.033.](#)
- Paper
2018 Keene, ... [Howard](#), ... Francis
“Rationale and design of the randomized multicentre His Optimized Pacing Evaluated for Heart Failure (HOPE - HF) trial”
[ESC Heart Fail. 2018 Jul 9. doi: 10.1002/ehf2.12315](#)
- Paper
2018 Al-Lamee, [Howard](#), ... Francis
“Fractional Flow Reserve and Instantaneous Wave-Free Ratio as Predictors of the Placebo-Controlled Response to Percutaneous Coronary Intervention in Stable Single-Vessel Coronary Artery Disease: Physiology-Stratified Analysis of ORBITA”
[Circulation. 2018 May 22. pii: CIRCULATIONAHA.118.033801.](#)
- Paper
2018 [Howard](#), Murthy
“A Song of Pressure and Flow, or There and Back Again”
[JACC Cardiovasc Interv. 2018 Apr 23;11\(8\):754-756.](#)
- Paper
2018 Whinnett, Sohaib, ... [Howard](#), ... Francis
“Multicenter Randomized Controlled Crossover Trial Comparing Hemodynamic Optimization Against Echocardiographic Optimization of AV and VV Delay of Cardiac Resynchronization Therapy: The BRAVO Trial”

[JACC Cardiovasc Imaging, 2018 May 11.](#)

- Paper
2018 Ahmad, [Howard](#), ... Sen
“Patent foramen ovale closure vs. medical therapy for cryptogenic stroke: a meta-analysis of randomized controlled trials”
[Eur Heart J. 2018 Mar 24.](#)
- Paper
2018 Ahmad, Demir, Rajkumar, [Howard](#), ... Sen
“Optimal antiplatelet strategy after transcatheter aortic valve implantation: a meta-analysis”
[Open Heart. 2018 Jan 26;5](#)
- Paper
2018 Petraco, Dehbi, [Howard](#) ... Francis
“Effects of disease severity distribution on the performance of quantitative diagnostic methods and proposal of a novel ‘V-plot’ methodology to display accuracy values”
[Open Heart. 2018 Jan 20;5\(1\)](#)
- Paper
2018 Al-Lamee, Thompson, Dehbi , Sen ... [Howard](#) ... Francis
“Percutaneous coronary intervention in stable angina (ORBITA): a double-blind, randomised controlled trial”
[Lancet. 2018 Jan 6;391\(10115\):31-40](#)
- Paper
2017 Sikkil, Francis, [Howard](#), Gordon, Rowlands, Peters, Lyon, Harding, MacLeod
“Hierarchical statistical techniques are necessary to draw reliable conclusions from analysis of isolated cardiomyocyte studies”
[Cardiovascular Research, cvx151, <https://doi.org/10.1093/cvr/cvx151>](#)
- Paper
2017 Shun-Shin, Zheng, Cole, [Howard](#), Whinnett, Francis
“Implantable cardioverter defibrillators for primary prevention of death in left ventricular dysfunction with and without ischaemic heart disease: a meta-analysis of 8567 patients in the 11 trials”
[Eur Heart J. 2017 Jun 7;38\(22\):1738-1746.](#)
- Paper
2016 [Howard](#), Shun-Shin, Hartley, Bhatt, Krum, Francis
“Quantifying the three biases that lead to unintentional overestimation of the blood-pressure lowering effect of renal denervation: meta-analysis of 148 trials of 6114 patients and implications for design of future trials”
[Circ Cardiovasc Qual Outcomes. 2016 Jan;9\(1\):14-22](#)
- Paper
2016 Maznyczka, [Howard](#), Banning, Gershlick
“A Propensity Matched Comparison of Return to Work and Quality of Life after Stenting or Coronary Artery Bypass Surgery”
[Open Heart. 2016 Jan 13;3\(1\):e000322.](#)

- Paper
2015 Patel, Hayward, Vassiliou, Patel, Howard, Di Mario
“Renal denervation for the management of resistant hypertension”
[Integr Blood Press Control. 2015; 8: 57–69.](#)
- Paper
2015 Howard, Patel, Shun-Shin, Mourad, Blacher, Mahfoud, Zeller, Weber, Francis
“Impact of number of prescribed medications on visit-to-visit variability of blood pressure: implications for design of future trials of renal denervation”
[J Hypertens. 2015 Nov;33\(11\):2359-67](#)
- Paper
2015 Jones, Howard, Rathod, Gallagher, Knight, Jain, Mathur, Mohiddin, Timmis, Mills, Archbold, Wragg
“The impact of socioeconomic status on all-cause mortality after percutaneous coronary intervention: an observational cohort study of 13,770 patients”
[EuroIntervention. 2015 Feb 22;10\(11\):e1-8.](#)
- Book chapter
Howard, Shun-Shin, Francis
“Great Myths of Blood Pressure Effect Size in Renal Denervation”
[Renal Denervation, 2015, 175-180](#)
- Paper
2014 Howard, Francis
“Overcoming the 3 biases obscuring the science of renal denervation in humans: big day bias, check-once-more bias and I'll-take-it-now bias.”
[Trends CV Med. 2014. doi:10.1016/j.tcm.2014.10.011](#)
- Paper
2014 Howard, Antoniou, Jones, Wragg
“Recent advances in antithrombotic treatment for acute coronary syndromes.”
[Expert Rev Clin Pharmacol. 2014 May 31:1-15.](#)
- Paper
2014 Howard, Jones, Gallagher, Rathod, Antoniou, Wright, Knight, Mathur, Weerackody, Wragg
“Glycoprotein IIb/IIIa inhibitors use and outcome after Percutaneous Coronary Intervention for Non-ST-elevation myocardial infarction”
[BioMed Research International 2014. doi: 10.1155/2014/643981](#)
- Paper
2014 Nowbar, Mielewczik, Karavassilis, Dehbi, Shun-Shin, Jones, Howard, Cole, Francis
“Discrepancies in autologous bone marrow stem cell trials and enhancement of ejection fraction (DAMASCENE): weighted regression and meta-analysis”
[BMJ. 2014 Apr 28;348:g2688. doi: 10.1136/bmj.g2688.](#)
- Paper
2014 Nowbar, Howard, Finegold, Asaria, Francis
“2014 Global geographic analysis of mortality from ischaemic heart disease by country, age and income: Statistics from World Health Organisation and United Nations”
[Int J Cardio 2014; doi: 10.1016/j.ijcard.2014.04.096](#)

- Paper
2014 Shun-shin, Howard, Francis
“Removing the hype from hypertension”
[BMJ. 2014 Mar 6;348:g1937. doi: 10.1136/bmj.g1937.](#)
- Paper
2014 Howard, Cole, Sievert, Bhatt, Papademetriou, Kandzari, Davies, Francis
“Unintentional overestimation of an expected antihypertensive effect in drug and device trials: Mechanisms and solutions”
[Int J Cardiol 2014; doi: 10.1016/j.ijcard.2013.12.183](#)
- Paper
2013 Howard, Nowbar, Francis
“Size of blood pressure reduction from renal denervation: insights from meta-analysis of antihypertensive drug trials of 4,121 patients with focus on trial design - the CONVERGE report”
[Heart. 2013 Nov;99\(21\):1579-87. doi: 10.1136/heartjnl-2013-304238](#)
- Paper
2012 Jones, Rathod, Howard, Gallagher, Antoniou, De Palma, Guttman, Cliffe, Colley, Butler, Ferguson, Mohiddin, Kapur, Knight, Jain, Rothman, Mathur, Timmis, Smith, Wragg
“Safety and Feasibility of Hospital Discharge 2 days following Primary Percutaneous Intervention for ST Segment Elevation Myocardial Infarction”
[Heart 2012;98:1722-1727 doi:10.1136/heartjnl-2012-302414](#)
- Paper
2012 Howard, Jones, Mills, Marley, Wragg
“Recurrent ascites due to constrictive pericarditis”
[Frontline Gastroenterol 2012;3:233-237 doi:10.1136/flgastr-2012-100173](#)
- Paper
2012 Howard, Ahmed, Guarino, Wijeyekoon
“Abdominal pain in an intensive care patient”
[Surgical Practice, 16: 114–115. doi: 10.1111/j.1744-1633.2012.00600.x](#)
- Paper
2012 Guarino, Astini, Howard, Colombelli
“Large mediastinal nodular ganglioneuroblastoma in a child from Africa”
[Ann Ital Chir. 2012 Nov-Dec;83\(6\):543-6.](#)

Grants

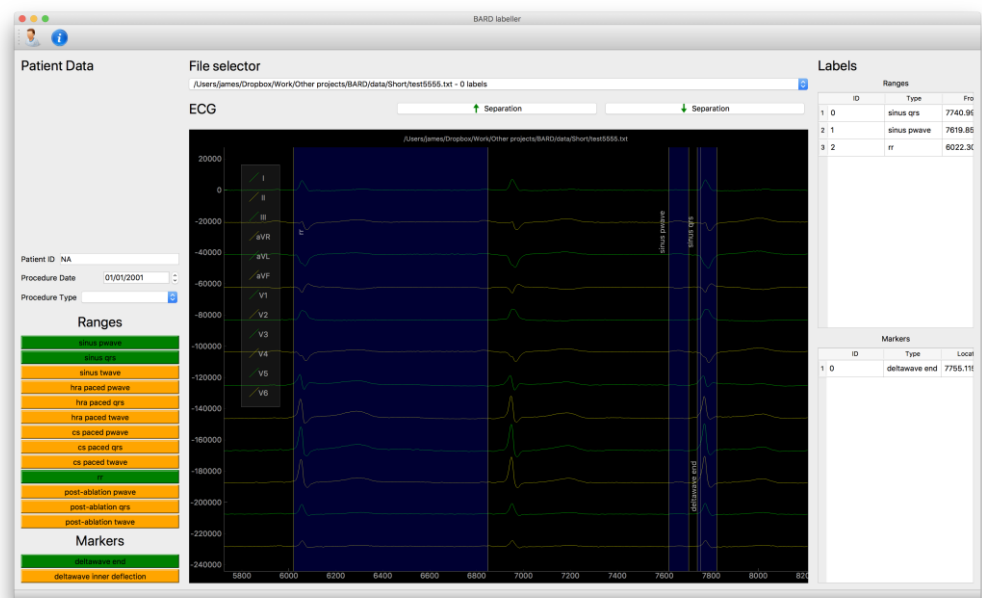
Fellowship **Wellcome Trust PhD Training Fellowship for Clinicians**
£300,000 Wellcome Trust / Imperial 4i programme

Project grant **Statin side effect or not? A patient-empowering within-subject randomized controlled trial and development of a practical technology to support 21st century primary prevention decisions.**
Co-applicant
£289,669
British Heart Foundation PG/15/7/31235

Other key projects

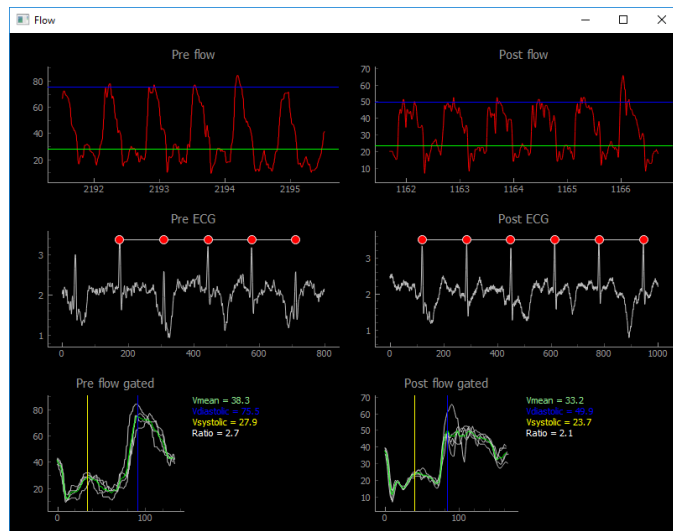
Desktop app **ECG waveform processing application to allow machine learning of signals**

A current project I am working on utilises convolutional recurrent neural networks to classify ECGs. I created an open source program to allow exporting of ECGs from the proprietary 'BARD' electrophysiology application. The program allows labelling of ECG waveforms and batch exporting, and is fully configurable via config files.



Desktop app **Coronary physiology analysis package**

A recent publication by our group required complex coronary waveform analysis. I created an open source python program for this. The work has been published in the Journal of the [American College of Cardiology](#) and the code is available on [GitHub](#).

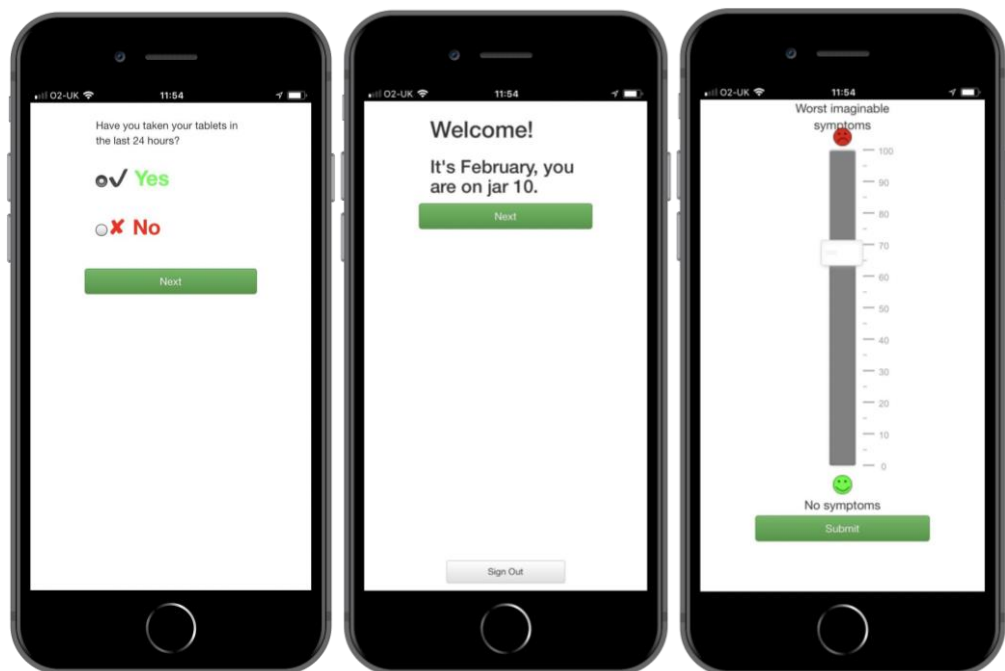


Mobile app

SAMSON Trial Quality of life

At Imperial College London we are running a one-year trial which allows people to determine what proportion of their symptoms are truly statin related. For this I have developed an HTML5/JavaScript application which allows trial participants to upload daily Quality of Life scores which can be reviewed in real-time by the study team. This ensures all recorded data are timely, cannot be retrospectively amended, and allows flairs of side effects to be picked up earlier. The app is also able to cache data when an internet connection is not available, to ensure data are not lost when participants are overseas without roaming, for example.

Screenshots:



Online database

The Cardiology Trials Database – cardiologytrials.org

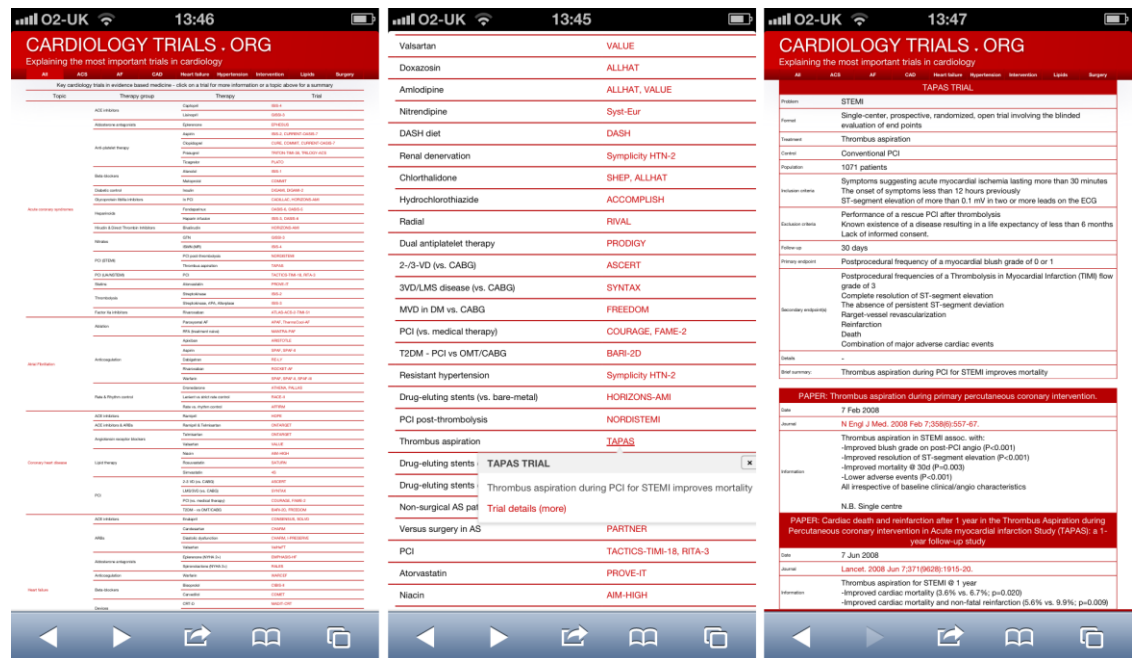
During my FY1 rotation in cardiology I became aware of the importance of a good understanding

of the evidence base. For example, I learned how the treatment of heart failure had been revolutionised by showing prognostic benefits from drugs acting via the renin-angiotensin-aldosterone system and beta-blockers, whilst digoxin had shown symptomatic yet no prognostic benefits. I tried to further my understanding online, yet found no easily accessible source of consolidated information. Some covered only sub-specialties, others compiled data into PowerPoint files that were impractical to quickly reference and often required registration.

I set out to construct a free database with the key trials trainees needed to be aware of and formatted in a fashion where it can be easily viewed 'on the run', e.g. on a smartphone.

See cardiologytrials.org

The site currently receives over 6000 visits per month and has received a third of a million page views since its inception.

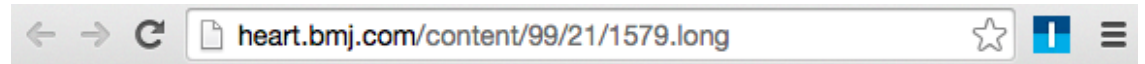


Chrome Extension

Imperial eJournals for Chrome

This small Chrome Extension allows easy access, via Imperial College Library, to journal articles, which would otherwise be behind a premium pay-wall. This small button to the right of the address bar will try to use the Imperial proxy to allow members of Imperial College to access premium content such as journals. It does this by simply altering the page URL. No user data is stored.

<https://chrome.google.com/webstore/detail/imperial-ejournals-for-ch/infolkakifickpdmjcggmhklgkbbpid>



Mobile app

FMCalc – The Free Medical Calculator

On acquiring a Windows Phone 7-based smartphone, I noticed there were no free medical calculators for the operating system, with only two highly priced options. I therefore worked to create a free alternative, FMCalc. The application is now on the official Windows Phone 7 marketplace and has been downloaded by over four thousand unique users in fifteen different countries. It includes over 40 medical criteria and calculators, including anion gap, CHADS2 score,

Child-Pugh score, Duke criteria, Rockall score and more. Feedback has been very positive, and I've continued adding scores such as the CHIP prediction rule following requests from users. See jamesphoward.com/fmcalc.htm

Prizes & Awards

- 2018 **Supervisor of Best Project, Computational Medicine BSc, Imperial College**
My student was awarded the prize for the highest scoring project within the Computational Medicine BSc at Imperial College London. This project ended up being published as a peer-reviewed publication in JACC:Clinical Electrophysiology, detailing AI interpretation of X-rays of cardiac rhythm devices.
- 2015 **UK research paper of the year**
Our meta-analysis on the discrepancies in trials of autologous bone marrow stem cell trials (*DAMASCENE*) won the award for the best UK research paper at the annual BMJ awards. The judges described the study as “a new approach to assessing the quality of research” that “blows the whistle on therapeutic claims, signalled by errors in reporting.”
- 2013 **British Hypertension Society Young Investigator Award Finalist**
For my work on meta-analysis of renal denervation and antihypertensive drugs (Howard *et al.* Heart (2013)).
- 2012 **British Cardiovascular Society Annual Conference**
Awarded a £150 grant, supported by the British Heart Foundation, for submitting an abstract in the top 12% at the Society's annual conference.
- 2010 **British Association of Dermatologists' Undergraduate Essay Prize**
£250 prize for designing an undergraduate dermatology course to be taught at UK medical schools.

Teaching experience

- 2017 - 2018 **BSc Student Supervisor – Pacemakers in neural networks**
I supervised a student in the Computational Medicine BSc. During this successful project the student gained an intermediate understanding of the Python programming language and helped us develop a neural network which could accurately identify pacemakers on X-ray.
- 2017, 2018 **Lecturer in “Machine Learning for Image Analysis”**
I deliver an annual lecture on machine learning to the Cardiovascular BSc students with an emphasis on medical image analysis.
- 2016 - 2017 **Imperial College Teaching Hero**
For my “organisation and delivery of undergraduate teaching to Year 6 Cardiology students” I was designated a Teaching Hero by Imperial College London.
- 2011 - 2012 **Junior Clinical Teaching Fellow – Colchester Hospital University NHS**

Foundation Trust

During my F2 attachment I was interviewed by the hospital's associate dean and granted the position of Junior Clinical Teaching Fellow, one of several over-subscribed teaching posts. My responsibility was to give regular teaching sessions over the academic year to third year medical students, with each week broadly based on the PBL topic set by the University. However, the associate dean emphasised that the sessions should be tailored to the students' needs, and from discussions with the previous year's students I identified a common theme of concern about the lack of observed clinical examinations. My approach was integration of academic discussion and clinical examination, and I have received very positive feedback.

2011

“Cardiology for Finals”

Lectured around 150 medical students on the topic of the cardiovascular system for medical finals. I placed emphasis on the difficult aspects of the examination, presentation skills, and tackling the station in a systematic way so that one can narrow down to a differential early on.

2010 - 2011

PBL Facilitator - Barts and The London School of Medicine

As the only FY1 PBL facilitator in the University, my role was to facilitate groups of medical students to explore their own learning objectives in case-based scenarios, guiding them where required.

2010

Practice OSCE examiner – The Royal London Hospital

Helped organise and run a practise OSCE session for final year medical students.

2009

Associate clinical supervisor – Cambridge University Medical School

Tutored new medical students through six two-hour sessions, covering clinical examination and history-taking.